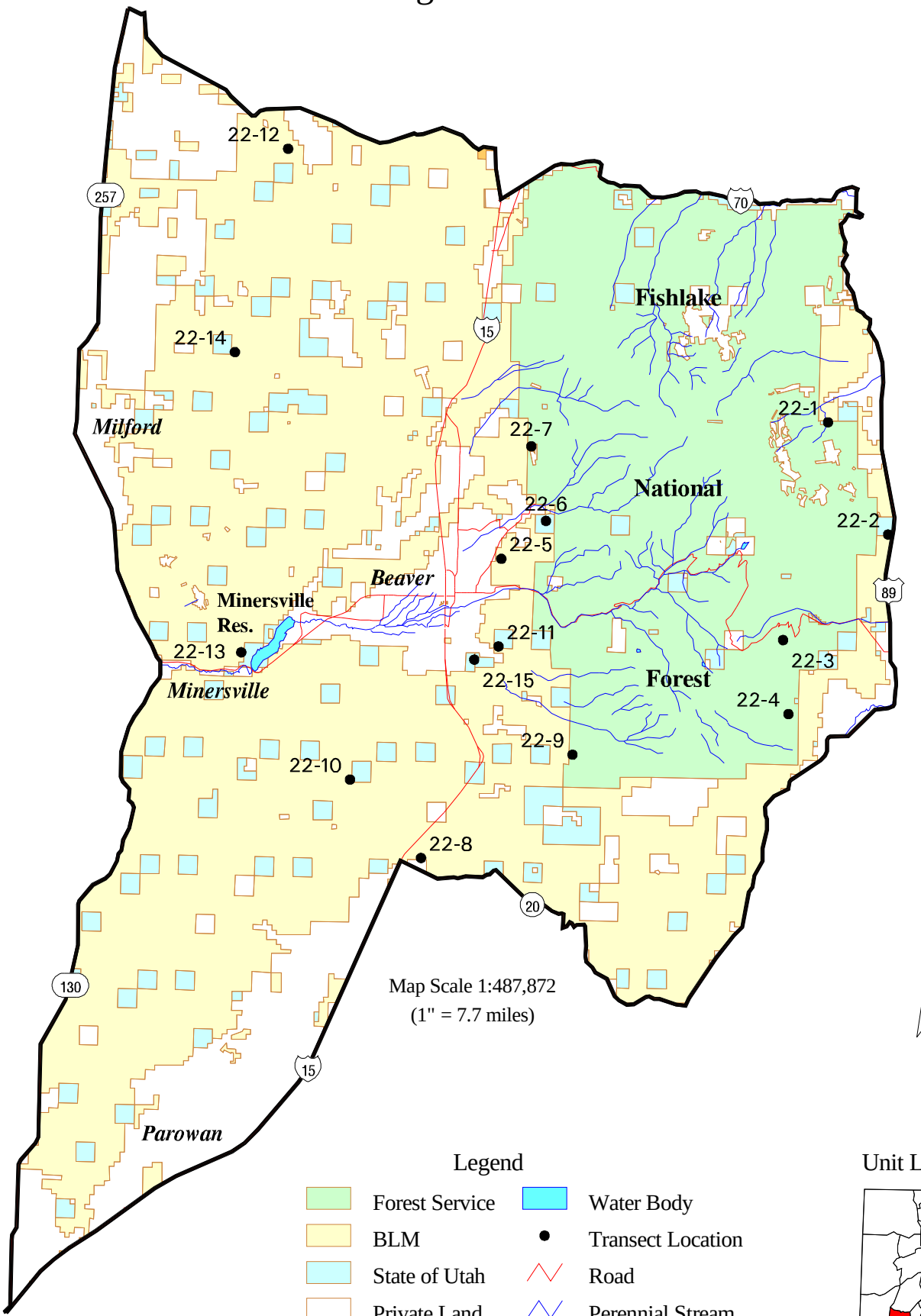
Management Unit 22



UDAF GIS May, 2000

WILDLIFE MANAGEMENT UNIT - 22 (49, 56) - BEAVER

Boundary Description

Iron, Garfield, Piute, Beaver, and Millard counties - Boundary begins at SR-130 and I-15; north on SR-130 to SR-21; north on SR-21 to SR-257; north on SR-257 to the Black Rock road; east on the Black Rock road to I-15; south on I-15 to I-70 to US-89; south on US-89 to SR-20 to I-15; south on I-15 to SR-130.

Management Unit Description

The Beaver wildlife management unit has been enlarged by combining deer herd unit 56 (Beaver) with deer herd unit 49 (Marysville-Circleville). The wildlife management unit now includes both slopes of the Tushar Mountains south of I-70. It also contains the Mineral Mountains south of the Black Rock road, a portion of Parowan Valley, Black Mountain, and Fremont Wash. Total usable range in the wildlife management unit is 1,154,477 acres. Sixty-one percent of the range is considered winter range and 39% is considered summer range. There is no yearlong range.

On the west side of the wildlife unit, the Black Mountains and the Mineral Mountains are typical of the arid mountains of western Utah. Neither support streams with permanent flows. They lack good summer range, but are vegetatively similar to most deer wintering areas of southern Utah. Both the Black and Mineral Mountains have relatively steep, rugged slopes and areas of rocky outcrops. Black Mountain is unlike the Mineral Mountains in that the top is dominated by gently rolling sagebrush hills and dry meadows.

The Tushar Mountains are more typical of the high elevation mountains of central and southern Utah and contain good summer range for deer and elk. The Tushar's have many small lakes and perennial streams. The western slopes of the Tushar Mountains are more gradual and receive sufficient precipitation to create good intermediate deer range which is used in the spring and fall and during mild winters. Delano Peak on the Tushar Mountains is the unit's highest point at an elevation of 12,173 feet. The low point in the unit is about 5,000 feet in the valley near Milford. The highest point in the Mineral Mountains is 9,578 feet on Granite Peak and Jack Henry Knoll at 8,668 feet is the highest area in the Black Mountains.

The east side of the Tushar Mountains is comprised of drainages which empty into the Sevier River. The major tributaries are Deer Creek, Beaver Creek, Bullion Creek, Cottonwood Creek, Ten Mile Creek, City Creek, Birch Creek, Pine Creek and Chokecherry Creek. Between Circleville and Marysvale, a broad river valley with gradual slopes joins the steep mountain slopes and sheer cliffs of the Tushar mountains. The portions north of Marysvale and south of Circleville (including Marysvale and Circleville Canyons) are composed of disjunct pinyon-juniper canyons. Towns in this area include: Sevier, Marysvale, Junction, and Circleville.

Most of the winter range (87%) is located on Forest Service or BLM managed lands. Additionally, 8% of the winter range is located on private land holdings and 6% are located on Utah State School Trust Lands and Division of Wildlife Resources management areas. In 1996 a fire burned on the north end of the management unit burning large tracts of winter range (see Antelope Mountain site #22-14).

On the west side of the Tushar Mountains, most of the winter range use is on the Black and Mineral Mountains. The winter ranges on these mountains were used quite extensively in the past by deer migrating from summer range on the Tushars. These migrations were essentially eliminated by the construction and fencing of I-15. Two underpasses and one overpass constructed for deer crossings have had moderate success in allowing deer to cross the freeway. The winter range on the east side of I-15 must carry the burden when animals are not willing to use the under and overpasses. Still, there is ample range for deer in normal winters. Only in severe winters when the usable range is limited to the lowest areas near the freeway does winterkill become a significant problem.

On the east side of the Tushar Mountains, the normal winter range boundaries range from 6,200 feet on the valley floor to 8,500 feet in the upper basins. Oak Basin often winters deer up to the 8,600 foot level. The upper limit along the steeper portions of the east face of Tushar Mountains is 7,200 feet. Severe winter range occupies 47,223 acres, 71% of the normal winter range (Huff and Bowns 1965). The upper limit of severe winter range is normally 7,000 feet, but goes as high as 8,000 feet in Oak Basin. Winter deer concentrations are found on south and southeast facing slopes. Minor migrations from the summer ranges of units 23 and 24 onto unit 22 winter ranges occur each year, but the major movement is an elevational movement from summer to winter range within the unit.

Wildlife Unit Management Objectives

Current management objectives for wildlife are to achieve a target population of 11,000 wintering deer with a post season buck to doe ratio of 15:100. Thirty percent of these bucks are to be three point or better. The target winter herd size for elk is to be 950 with a post season composition of 8 bulls to 100 cows. At least 4 of these bulls must be 2½ years of age or older. The deer herd on the Beaver unit had an estimated 1996 post season population of 10,000 head.

Trend Study 22-1-98

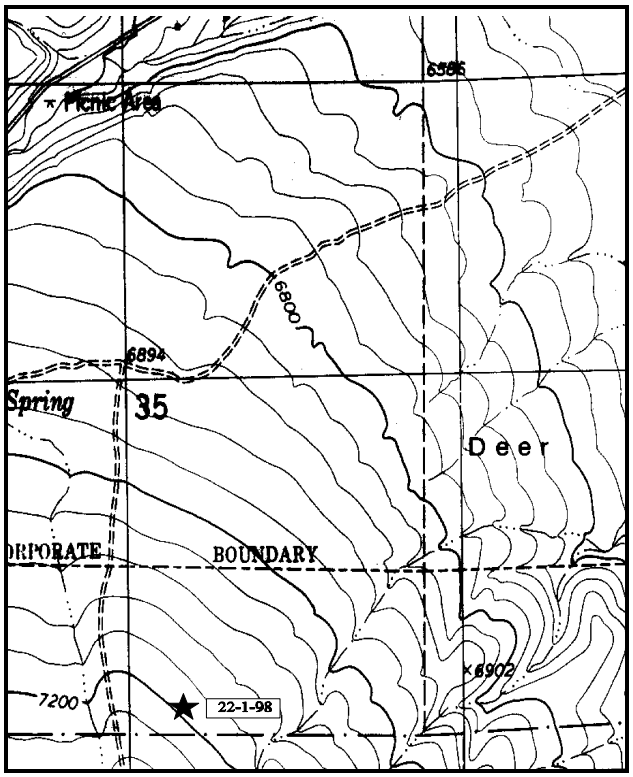
Study site name: Deer Flat . Range type: Chained, Cabled, Seeded, PJ .

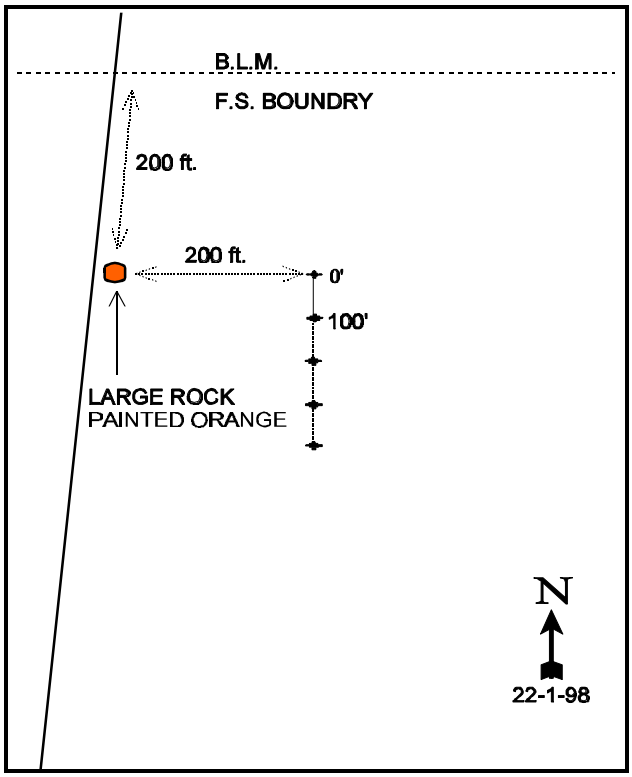
Compass bearing: frequency baseline 180 degrees.

Footmark (first frame placement) 5 feet. Frequency belt placement; line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

LOCATION DESCRIPTION

From mile marker 179 south of Marysvale, proceed 0.6 miles and turn right on a dirt road. The road forks immediately beyond a fence, stay to the right. Proceed 0.5 miles to another fork in the road at a fence corner. Go straight through the gate, passing a road on each side. Continue 0.1 miles and turn right. Proceed 2.8 miles up this road, following a ditch, passing 2 ponds and passing through a DWR fence to another fork. Turn left. Go 0.65 miles (through a gate) to a large painted rock on the left side of the road. The 0-foot baseline stake is 200 feet due east of the rock. It is a rebar with a browse tag #7106 attached.





Map Name: Mount Brigham, Utah

Diagrammatic Sketch

Township 27S , Range 4W , Section 35

UTM 4252025.198 N, 388051.581 E

DISCUSSION

Trend Study No. 22-1 (49-1)

The Deer Flat trend study is located on BLM administered land and is considered an important deer wintering area. The area was chained and seeded to perennial grasses in 1968. The slope is 15%-20% with a northwest aspect and an elevation of 6,800 feet. Water is available in Pine Creek which is located about ½ mile to the north. Across the Forest Service-BLM boundary, 200 feet to the north, is another chaining and seeding project completed in 1981. A pellet group transect read in 1998 on the site indicates 58 deer days use/acre, 12 elk days use/acre, and 11 cow days use/acre.

Soil textural analysis shows it to be a sandy clay loam which appears to have good permeability and water holding capacity. Parent material appears to be sandstone and limestone. The soil profile is rocky throughout with an average effective rooting depth (see methods) of almost 9 inches. The soil temperature is 54°F measured at a depth of over 10 inches. The pH is slightly acidic (6.2). Erosion is currently not a problem on the site, although the road to the site crosses a small creek and the water washes down the road causing severe erosion.

In 1998, 13 browse species were encountered on the transect. Mountain big sagebrush was the key species. In both 1985 and 1991, a high percentage of plants were classified as young, 54% and 47% respectively. Percent decadence increased from 4% in 1985 to 22% in 1991. In 1998, the mountain big sagebrush density was estimated to be 3,640 plants/acre. This much lower estimate is mostly because of the much larger sample size that gives more accurate estimates for browse populations, because the dead within the population can only explain 2% of the decrease. The number of young plants encountered in 1998 declined to 13% of the population and no seedlings were encountered. Percent decadency is similar to that of 1991 at 19%. Utilization is comparable over all years with mostly moderate use. Percent cover for mountain big sagebrush is currently 19%. This is a maturing population that appears stable and healthy. Black sagebrush currently has an estimated density of 3,920 plants/acre. Percent decadency is currently the same as reported in 1991 at 16% and higher then reported in 1985 (7%). Utilization is light to moderate in 1985 and 1998, and moderate to heavy in 1991.

Other valuable browse plants common to the area are mountain mahogany, slenderbush eriogonum, and Gambel oak. The lower overall density estimates for these species in 1998 is due to the greatly increased sample size. The less desirable species, broom snakeweed, pricklypear cactus, Greene's rabbitbrush, stickyleaf low rabbitbrush, and gray horsebrush are less abundant and have low biotic potential. Point-centered quarter data collected in 1998 indicates 39 pinyon trees/acre and 13 Utah juniper trees/acre. Average trunk diameter is nearly 4 inches for both species. Photographs show a noticeable increase in the size (height and width) of the trees across the site over all years, however densities are still very low.

Crested wheatgrass provides 35% of the grass cover and 31% of the total herbaceous cover. Muttongrass also provides some cover, but nested frequency values show a significant decline over all years. Other abundant grasses include: smooth brome, Junegrass, and Sandberg bluegrass. These grasses are desirable species that add variety to the diets of game animals and livestock. Cheatgrass is present, but is currently in low abundance. Perennial grass sum of nested frequency is currently 432, the lowest of all years.

Forbs are diverse yet offer little cover or forage. Longleaf phlox and redroot eriogonum are the most common species. The forbs are an important source of deer forage during early spring green-up when energy demands for fetal development and antler growth are high.

1985 APPARENT TREND ASSESSMENT

Erosion was not detected and the soil appears stable to improving. Seventeen years after the chaining, the vegetative community appears healthy with high diversity and a good mixture of grasses, forbs and shrubs.

The community appears stable, although age composition indicates that the shrub component may expand somewhat.

1991 TREND ASSESSMENT

Here again is the repetitious theme, the extended drought has apparently aggravated the situation with increases in percent bare ground, decreases in litter and rock-pavement cover, thus exposing the soil to the harmful effects of high intensity summer storms. The soil trend is slightly downward. Most of the key shrubs (black sagebrush, mountain big sagebrush, curlleaf mountain mahogany) have experienced some kind of increases in their respective densities. Mountain mahogany was the only key browse species that experienced a noticeable decrease in it's density. Rates of decadency have increased for all key browse species regardless of the direction of their respective population changes. Another important characteristic to monitor is the proportion of the plants that are considered to be in poor vigor. This trend should turn around with better precipitation patterns in coming years and an end to the extended drought. The browse trend is slightly up. Most of the herbaceous understory species are also experiencing increased values for nested and quadrat frequency. The herbaceous understory trend is slightly upward.

TREND ASSESSMENT
soil - slightly downward
browse - slightly up
herbaceous understory - slightly upward

1998 TREND ASSESSMENT

Vegetation and litter cover are abundant on this site and there is little sign of current erosion. The soil trend is stable. With the exception of black sagebrush, the browse populations show a decrease in density. This decrease is due to the much larger sample size now used to estimate density. Mountain big sagebrush age structure indicates a maturing population that is currently healthy. The black sagebrush population is also healthy, although more seedling plants for each population would be beneficial. The browse trend is stable. The herbaceous understory trend is slightly downward due a decrease in perennial herbaceous understory sum of nested frequency. Grasses dominate the herbaceous understory and account for most of the nested frequency decline.

TREND ASSESSMENT
soil - stable
browse - stable
herbaceous understory - slightly downward

HERBACEOUS TRENDS --
Herd unit 22 , Study no: 1

Type	Species	Nested Frequency '85	'91	'98	Quadrat Frequency '85	'91	'98	Average Cover % '98
G	Agropyron cristatum	a75	b104	ab107	32	44	38	5.05
G	Agropyron spicatum	4	10	14	2	4	6	.42
G	Bouteloua gracilis	a-	c39	b10	-	14	5	.07
G	Bromus inermis	27	45	41	12	20	14	1.92
G	Bromus tectorum (a)	-	-	37	-	-	16	.56
G	Carex spp.	12	14	20	4	5	8	.14
G	Koeleria cristata	59	43	60	30	19	29	1.04
G	Oryzopsis hymenoides	-	5	-	-	2	-	-
G	Poa fendleriana	c255	b195	a107	87	75	41	3.30
G	Poa secunda	a-	a-	b45	-	-	18	1.68
G	Sitanion hystrix	a40	b65	a21	22	35	11	.20
G	Sporobolus contractus	b14	a-	a-	8	-	-	-
G	Stipa comata	a9	b49	a7	4	21	4	.19
Total for Annual Grasses		0	0	37	0	0	16	0.56
Total for Perennial Grasses		495	569	432	201	239	174	14.05
Total for Grasses		495	569	469	201	239	190	14.61
F	Agoseris glauca	a-	b9	ab6	-	6	3	.04
F	Antennaria rosea	-	2	3	-	2	1	.03
F	Arabis demissa	3	-	1	1	-	1	.03
F	Astragalus spp.	11	5	9	5	3	6	.08
F	Astragalus utahensis	-	-	2	-	-	1	.00
F	Castilleja chromosa	-	11	-	-	5	-	-
F	Camelina microcarpa (a)	-	-	1	-	-	1	.00
F	Calochortus nuttallii	b14	b18	a-	7	9	-	-
F	Castilleja spp.	-	-	1	-	-	1	.00
F	Erigeron pumilus	-	3	6	-	1	2	.06
F	Eriogonum racemosum	23	26	31	12	14	16	.25
F	Lesquerella intermedia	-	-	1	-	-	1	.00
F	Lithospermum ruderale	2	1	3	2	1	2	.30
F	Lomatium spp.	-	3	-	-	3	-	.00
F	Machaeranthera canescens	-	-	-	-	-	-	.01
F	Microsteris gracilis (a)	-	-	2	-	-	1	.00
F	Orobanche fasciculata	-	-	7	-	-	3	.04
F	Petradoria pumila	14	12	15	7	5	6	.66
F	Phlox longifolia	41	58	55	20	29	25	.23
F	Polygonum douglasii (a)	-	-	15	-	-	9	.04
F	Sphaeralcea coccinea	7	7	3	4	4	1	.03
F	Tragopogon dubius	4	-	-	2	-	-	-

Type	Species	Nested Frequency '85	'91	'98	Quadrat Frequency '85	'91	'98	Average Cover % '98
F	Trifolium spp.	$_{c}$28	$_{b}$31	$_{a}$12	11	17	6	.03
F	Unknown forb-perennial	2	-	-	1	-	-	-
Total for Annual Forbs		0	0	18	0	0	11	0.05
Total for Perennial Forbs		149	186	155	72	99	75	1.82
Total for Forbs		149	186	173	72	99	86	1.87

Values with different subscript letters are significantly different at % = 0.10 (annuals excluded)

BROWSE TRENDS --
Herd unit 22 , Study no: 1

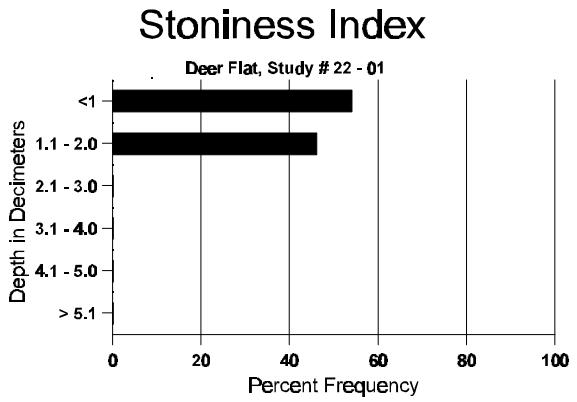
Type	Species	Strip Frequency '98	Average Cover % '98
B	Artemisia nova	53	8.77
B	Artemisia tridentata vaseyana	83	18.67
B	Cercocarpus ledifolius	5	.06
B	Cercocarpus montanus	18	.38
B	Chrysothamnus depressus	5	.01
B	Chrysothamnus viscidiflorus viscidiflorus	1	-
B	Eriogonum microthecum	14	.73
B	Gutierrezia sarothrae	1	.03
B	Juniperus osteosperma	0	-
B	Mammillaria spp.	0	-
B	Opuntia spp.	26	.41
B	Pinus edulis	5	2.64
B	Purshia tridentata	-	.00
B	Quercus gambelii	9	1.80
B	Sclerocactus	2	.01
B	Tetradymia canescens	0	-
Total for Browse		222	33.52

BASIC COVER --
Herd unit 22 , Study no: 1

Cover Type	Nested Frequency '98	Average Cover % '85	'91	'98
Vegetation	322	9.50	11.00	42.20
Rock	248	9.50	11.75	15.98
Pavement	221	8.00	3.50	9.25
Litter	388	60.00	53.50	50.24
Cryptogams	59	0	.25	.58
Bare Ground	230	13.00	20.00	12.41

SOIL ANALYSIS DATA --
Herd Unit 22, Study # 01, Study Name: Deer Flat

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%0M	PPM P	PPM K	dS/m
8.7	53.8 (10.5)	6.2	52.0	27.4	20.6	6.5	12.1	233.6	1.0



PELLET GROUP FREQUENCY --
Herd unit 22 , Study no: 1

Type	Quadrat Frequency '98
Rabbit	37
Elk	5
Deer	55
Cattle	7

BROWSE CHARACTERISTICS --
Herd unit 22 , Study no: 1

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Artemisia nova																		
S	85	7	-	-	-	-	-	-	-	-	7	-	-	-	466			7
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
Y	85	15	4	-	-	-	-	-	-	-	19	-	-	-	1266			19
	91	6	4	5	1	-	-	-	-	-	16	-	-	-	1066			16
	98	23	-	-	2	-	-	-	-	-	25	-	-	-	500			25
M	85	4	5	-	-	-	-	-	-	-	9	-	-	-	600	13	20	9
	91	5	3	12	1	1	3	-	-	-	25	-	-	-	1666	10	17	25
	98	100	29	2	9	-	-	-	-	-	140	-	-	-	2800	15	23	140
D	85	2	-	-	-	-	-	-	-	-	1	-	1	-	133			2
	91	1	2	2	-	1	1	-	-	1	5	-	-	3	533			8
	98	27	4	-	-	-	-	-	-	-	28	-	-	3	620			31
X	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	1	-	-	-	-	-	-	-	-	1	-	-	-	140			7

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	30%	00%	03%	+39%
'91	22%	49%	06%	+17%
'98	17%	01%	02%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'85	1999	Dec:	7%
	'91	3265		16%
	'98	3920		16%

Artemisia tridentata vaseyana																		
S	85	17	1	-	-	-	-	-	-	-	18	-	-	-	1200			18
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Y	85	53	22	-	-	-	-	-	-	-	74	-	1	-	5000			75
	91	28	18	12	3	-	7	-	-	-	66	-	2	-	4533			68
	98	22	2	-	-	-	-	-	-	-	23	-	1	-	480			24
M	85	22	34	3	-	-	-	-	-	-	58	1	-	-	3933	23	29	59
	91	11	12	14	2	1	5	-	-	-	44	-	1	-	3000	24	28	45
	98	61	51	11	1	-	-	-	-	-	117	7	-	-	2480	22	32	124
D	85	1	5	-	-	-	-	-	-	-	6	-	-	-	400			6
	91	4	17	6	-	2	1	1	-	-	26	-	2	3	2066			31
	98	16	18	-	-	-	-	-	-	-	33	-	-	1	680			34
X	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	140			7

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	44%	02%	.71%	+ 3%
'91	35%	31%	06%	-62%
'98	39%	06%	01%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'85	9333	Dec:	4%
	'91	9599		22%
	'98	3640		19%

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Cercocarpus ledifolius																		
Y	85	1	-	-	-	-	-	-	-	-	1	-	-	-	66			1
	91	-	-	1	-	1	-	-	-	-	2	-	-	-	133			2
	98	5	-	-	-	-	-	-	-	-	5	-	-	-	100			5
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	98	-	-	-	1	-	-	-	-	-	1	-	-	-	20	16	16	1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	00%	00%	00%	+50%
'91	50%	50%	00%	-10%
'98	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
'85	66	Dec:		-
'91	133			-
'98	120			-

Cercocarpus montanus																		
S	85	14	-	-	-	-	-	-	-	-	14	-	-	-	933			14
	91	-	1	1	-	-	-	-	-	-	2	-	-	-	133			2
	98	3	-	-	-	-	-	-	-	-	3	-	-	-	60			3
Y	85	2	2	15	-	-	-	-	-	-	19	-	-	-	1266			19
	91	-	-	4	-	-	-	-	-	-	4	-	-	-	266			4
	98	7	2	-	1	2	-	1	-	-	13	-	-	-	260			13
M	85	-	2	-	-	-	-	-	-	-	2	-	-	-	133	15	13	2
	91	-	-	1	1	-	4	1	-	-	7	-	-	-	466	9	11	7
	98	3	1	1	-	1	-	-	-	-	6	-	-	-	120	18	18	6
D	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	3	-	-	-	-	-	-	2	-	-	1	200			3
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
X	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	20			1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	19%	71%	00%	-33%
'91	00%	86%	07%	-59%
'98	32%	05%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
'85	1399	Dec:		0%
'91	932			21%
'98	380			0%

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Chrysothamnus depressus																		
Y	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	2	1	-	-	-	-	-	-	-	2	1	-	-	60			3
M	85	2	-	-	-	-	-	-	-	-	2	-	-	-	133	2	5	2
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	98	2	-	-	1	-	-	-	-	-	3	-	-	-	60	2	8	3

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	00%	00%	00%	
'91	00%	00%	00%	
'98	17%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'85	133	Dec:	-
	'91	0		-
	'98	120		-

Chrysothamnus viscidiflorus viscidiflorus																		
M	85	1	-	-	-	-	-	-	-	-	1	-	-	-	66	4	9	1
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	98	1	-	-	-	-	-	-	-	-	1	-	-	-	20	11	13	1
D	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	1	-	-	-	-	-	-	1	-	-	-	66			1
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	00%	00%	00%	+ 0%
'91	00%	100%	00%	-70%
'98	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'85	66	Dec:	0%
	'91	66		100%
	'98	20		0%

Eriogonum microthecum																		
Y	85	8	-	-	-	-	-	-	-	-	8	-	-	-	533			8
	91	3	1	-	1	-	-	-	-	-	5	-	-	-	333			5
	98	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
M	85	10	1	2	-	-	-	-	-	-	13	-	-	-	866	5	7	13
	91	9	4	4	4	-	2	3	-	-	26	-	-	-	1733	6	6	26
	98	14	2	-	2	-	-	-	-	-	18	-	-	-	360	6	12	18
D	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	1	-	-	-	-	1	-	-	-	1	-	-	1	133			2
	98	1	-	-	-	-	-	-	-	-	-	-	-	1	20			1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	05%	10%	00%	+36%
'91	15%	21%	03%	-82%
'98	10%	00%	05%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'85	1399	Dec:	0%
	'91	2199		6%
	'98	400		5%

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Gutierrezia sarothrae																		
Y	85	5	-	-	-	-	-	-	-	-	5	-	-	-	333			5
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	85	22	-	-	-	-	-	-	-	-	22	-	-	-	1466	7	5	22
	91	5	-	-	-	-	-	-	-	-	5	-	-	-	333	8	8	5
	98	1	-	-	-	-	-	-	-	-	1	-	-	-	20	7	5	1
D	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	1	-	-	-	-	-	-	-	-	1	-	-	-	66			1
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	00%	00%	00%	-78%
'91	00%	00%	00%	-95%
'98	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'85	1799	Dec:	0%
	'91	399		17%
	'98	20		0%

Juniperus osteosperma																		
M	85	1	-	-	-	-	-	-	-	-	1	-	-	-	66	44	33	1
	91	-	-	-	1	-	-	-	-	-	1	-	-	-	66	63	67	1
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	00%	00%	00%	+ 0%
'91	00%	00%	00%	
'98	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'85	66	Dec:	-
	'91	66		-
	'98	0		-

Mammillaria spp.																		
B	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	-	-	-	2	-	-	-	-	-	2	-	-	-	40			2

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	00%	00%	00%	
'91	00%	00%	00%	
'98	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'85	0	Dec:	-
	'91	0		-
	'98	40		-

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Opuntia spp.																		
S	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	3	-	-	-	-	-	-	-	-	3	-	-	-	200			3
	98	2	-	-	-	-	-	-	-	-	2	-	-	-	40			2
Y	85	8	-	2	-	-	-	-	-	-	9	-	1	-	666			10
	91	15	-	3	2	-	-	-	-	-	20	-	-	-	1333			20
	98	8	-	-	1	-	-	-	-	-	9	-	-	-	180			9
M	85	30	-	1	-	-	-	-	-	-	24	-	7	-	2066	4	6	31
	91	13	-	2	-	-	-	-	-	-	15	-	-	-	1000	5	11	15
	98	24	-	-	1	-	-	-	-	-	25	-	-	-	500	5	10	25
D	85	3	-	-	-	-	-	-	-	-	3	-	-	-	200			3
	91	2	-	-	-	-	-	-	-	-	2	-	-	-	133			2
	98	2	-	-	-	-	-	-	-	-	-	-	-	2	40			2

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	00%	07%	18%	-16%
'91	00%	14%	00%	-71%
'98	00%	00%	06%	

Total Plants/Acre (excluding Dead & Seedlings)				
'85	2932	Dec:		7%
'91	2466			5%
'98	720			6%

Pinus edulis																		
Y	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	1	-	-	-	-	-	-	-	-	1	-	-	-	66			1
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	98	5	-	-	-	-	-	-	-	-	5	-	-	-	100	-	-	5
X	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	20			1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	00%	00%	00%	
'91	00%	00%	00%	+34%
'98	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)			
'85	0	Dec:	-
'91	66		-
'98	100		-

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Quercus gambelii																		
S	85	3	-	-	-	-	-	-	-	-	3	-	-	-	200			3
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Y	85	-	1	-	-	-	-	-	-	-	1	-	-	-	66			1
	91	-	1	1	-	-	-	-	-	-	2	-	-	-	133			2
	98	5	-	-	-	-	-	-	-	-	5	-	-	-	100			5
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	98	12	2	7	-	-	-	-	-	-	21	-	-	-	420	31	28	21
D	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	1	-	-	-	-	-	-	-	-	-	-	-	1	20			1
X	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	40			2

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	100%	00%	00%	+50%
'91	50%	50%	00%	+75%
'98	07%	26%	04%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'85	66	Dec:	0%
	'91	133		0%
	'98	540		4%

Sclerocactus																		
S	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
Y	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	1	-	-	-	-	-	1	-	-	-	66			1
	98	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	98	1	-	-	-	-	-	-	-	-	1	-	-	-	20	2	3	1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	00%	00%	00%	
'91	00%	00%	00%	-39%
'98	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'85	0	Dec:	-
	'91	66		-
	'98	40		-

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Tetradymia canescens																		
M	85	1	-	-	-	-	-	-	-	-	1	-	-	-	66	4	6	1
	91	-	-	-	1	-	-	1	-	-	-	2	-	-	133	6	7	2
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	00%	00%	00%	+50%
'91	00%	00%	00%	
'98	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'85	66	Dec:	-
	'91	133		-
	'98	0		-

Trend Study 22-2-98

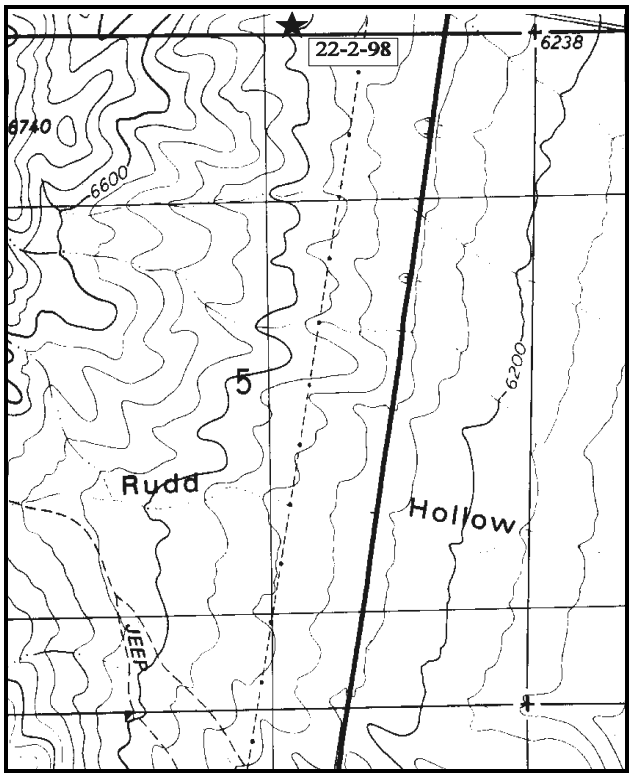
Study site name: Piute Reservoir . Range type: Big Sagebrush .

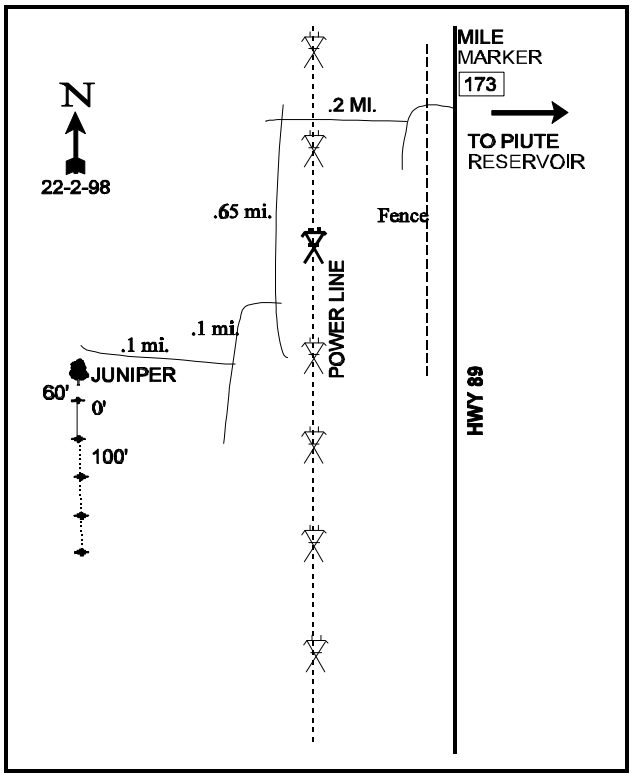
Compass bearing: frequency baseline 180 degrees.

Footmark (first frame placement) 5 feet. Frequency belt placement; line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

LOCATION DESCRIPTION

From mile marker 173 on Route 89 south of Marysvale, go 0.1 miles south and turn west on a faint, grassy road. Take and immediate right after going through the fence. Proceed 0.2 miles to a fork, go left for 0.65 miles to a fork. Go right for 0.1 miles to another fork and then immediately right for 0.1 miles to a juniper located 20 yards south of the road. The 0-foot end of the frequency baseline is 5 yards south of the juniper. The stakes are all rebar and the 0-foot stake has a browse tag #7080 attached.





Map Name: Piute Reservoir Diagrammatic Sketch

Township 29S , Range 3W , Section 5 UTM 4242529.130 N, 393135.041 E

DISCUSSION

Trend Study No. 22-2 (49-2)

The Piute Reservoir transect is located on BLM administered land approximately 1½ miles west of the dam and 1/4 mile west of Highway 89. The slope is gentle (2-3%) with a southeast aspect and an elevation of 6,400 feet. The range type is Wyoming big sagebrush. The study is within the Junction Cattle Allotment with joint Forest Service and BLM use seasons from May 1 through June 10 and November 1 through February 15 annually. Deer use occurs mainly during the winter and early spring. In 1991, it was noted that pellet groups were scattered throughout the area and one antler shed was found. In 1998, a pellet group transect on the site indicated 21 deer days use/acre. Additionally, 5 shed deer antlers were found in the area.

Soil textural analysis indicates a sandy loam soil with a neutral pH (7.3). The soil is loose and infiltration rates and water holding capacity are probably quite high. Soil temperature was 71.6°F at a depth of 14 inches. Percent rock and pavement cover together have slowly declined since 1985, while percent bare ground has slowly increased. In 1991, small erosion rills were common on the slopes and active gullies were prominent throughout the area. In 1998, some erosion was apparent, but it did not appear to be excessive or accelerated.

The key browse on the site is Wyoming big sagebrush. These plants average 20 inches in height and show light to moderate hedging. In 1991, the age distribution indicated a slowly increasing population. Thirty-four percent of the plants encountered were young, while 28% were classified as mature. Percent decadency increased from 19% in 1985 to 34% in 1991. The percentage of plants in poor vigor increased from 3% (1985) to 31% (1991). Currently, the population has become more mature with 14% of the plants classified as young and 57% classified as mature. In 1998, the estimated density is 3,560 plants/acre and percent cover is just above 18%. Percent decadency has decreased slightly since 1991 to 29%, however the number of decadent plants classified as dying has greatly increased from 6% to 47%. Low rabbitbrush (*Chrysothamnus viscidiflorus stenophyllus*) density is currently estimated to be 3,400 plants/acre. Age structure indicates a mature population with fewer seedling and young plants encountered in 1998 than in any previous years. The mature plants are approximately ½ the size of mature sagebrush plants. The rabbitbrush showed light to moderate use in 1985, but no use in 1991 or 1998. Pricklypear cactus is the only other browse plant common to the area and is present in very low densities. A pinyon and Utah juniper community in the foothills 1/8 mile to the west, provides escape and thermal cover.

Herbaceous vegetation continues to be sparse as illustrated by a total cover of less than 2%. Five grasses were encountered in 1998; bottlebrush squirreltail, Indian ricegrass, cheatgrass, a sedge, and needle-and-thread grass. All are cool-season grasses with relatively low densities. Five species of perennial forbs were again observed in 1998, all in very low abundance. An annual ragweed is particularly abundant along washes and the disturbed roadway.

1985 APPARENT TREND ASSESSMENT

The soil is one of high erosion potential and soil loss is common throughout the area. Both of the prominent browse species, Wyoming big sagebrush and low rabbitbrush, appear to be increasing in the absence of competition from grasses and forbs. Sod-forming grasses are conspicuously lacking. Herbaceous species are sparse and provide very little soil protection between the shrubs. Thus, trend of both the soil and the vegetative community is downward due in large measure to the absence of sod-forming grasses and more desirable forbs. Perhaps spring grazing should be eliminated for several years.

1991 TREND ASSESSMENT

The soil trend is downward because of the sharp increase in percent bare ground and decrease in litter cover at only 24%, which for this area, makes it much more susceptible to soil loss during high intensity summer storms which occur often. Wyoming big sagebrush and low rabbitbrush, have noted increases in their

respective densities, but percent decadency has increased for sagebrush (34%). There are two more critical measurements that are of concern for this sagebrush community. This would include the form class which is showing that 29% of the plants are heavily browsed, but more importantly, the proportion of the population that are classified as having poor vigor is now up to 30%. The browse trend is slightly downward. There are very few forbs or grasses occurring on the site and most have shown declines since 1985. The trend for herbaceous understory is slightly downward. The only way to turn around this trend is to discontinue habitual spring grazing.

TREND ASSESSMENT
soil - down
browse - slightly downward
herbaceous understory - slightly downward

1998 TREND ASSESSMENT

The soil trend is stable, but the soil is very vulnerable to high intensity rainstorms. Percent bare ground cover is increasing, while percent rock and pavement cover combined is also decreasing. The shrub interspaces are devoid of any protective ground cover. The browse trend is slightly downward with an increase in the percentage of the plants classified as dying. Percent decadency has stayed relatively stable since 1991 while the percentage of plants classified with poor vigor has declined to 15%. The herbaceous understory trend is slightly upward. Perennial grass sum of nested frequency has increased from 33 in 1991 to 75 in 1998. Similarly, perennial herbaceous understory sum of nested frequency has increased from 54 in 1991 to 191 in 1998.

TREND ASSESSMENT
soil - stable, but very vulnerable to erosion
browse - slightly downward
herbaceous understory - slightly upward

HERBACEOUS TRENDS --
Herd unit 22 , Study no: 2

Type	Species	Nested Frequency '85	'91	'98	Quadrat Frequency '85	'91	'98	Average Cover % '98
G	Bromus tectorum (a)	-	-	3	-	-	1	.00
G	Carex spp.	-	2	1	-	2	1	.00
G	Oryzopsis hymenoides	3	11	11	1	6	6	.28
G	Sitanion hystrix	22	19	36	14	9	15	.71
G	Stipa comata	$_{ab}$12	$_{a}$1	$_{b}$25	7	1	9	.65
Total for Annual Grasses		0	0	3	0	0	1	0.00
Total for Perennial Grasses		37	33	73	22	18	31	1.65
Total for Grasses		37	33	76	22	18	32	1.65
F	Ambrosia spp.	2	-	-	1	-	-	-
F	Astragalus spp.	$_{b}$29	$_{a}$5	$_{ab}$15	15	3	7	.23
F	Chaenactis douglasii	-	-	1	-	-	1	.00
F	Cryptantha spp.	-	-	6	-	-	2	.06

Type	Species	Nested Frequency '85	'91	'98	Quadrat Frequency '85	'91	'98	Average Cover % '98
F	Eriogonum cernuum (a)	$_{b}$35	$_{a}$7	$_{a}$5	14	4	2	.01
F	Orobanche fasciculata	-	-	1	-	-	1	.00
F	Phlox longifolia	3	6	3	1	3	1	.00
F	Unknown forb-annual (a)	-	7	-	-	3	-	-
F	Unknown forb-perennial	3	3	-	1	2	-	-
Total for Annual Forbs		35	14	5	14	7	2	0.00
Total for Perennial Forbs		37	14	26	18	8	12	0.30
Total for Forbs		72	28	31	32	15	14	0.31

Values with different subscript letters are significantly different at % = 0.10 (annuals excluded)

BROWSE TRENDS --
Herd unit 22 , Study no: 2

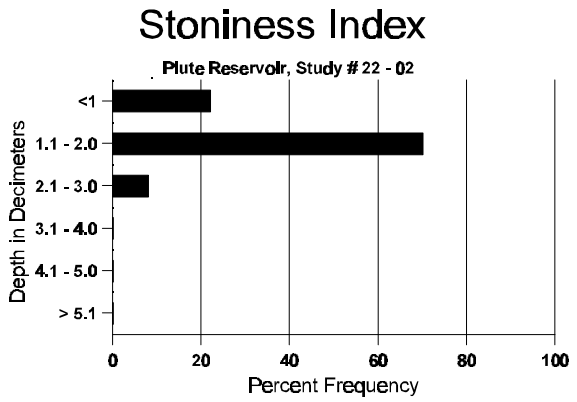
Type	Species	Strip Frequency '98	Average Cover % '98
B	Amelanchier utahensis	1	-
B	Artemisia tridentata wyomingensis	84	18.43
B	Cercocarpus ledifolius	0	-
B	Chrysothamnus viscidiflorus stenophyllus	63	7.55
B	Juniperus osteosperma	0	-
B	Leptodactylon pungens	-	.38
B	Opuntia spp.	1	.15
B	Pinus edulis	2	.18
Total for Browse		151	26.70

BASIC COVER --
Herd unit 22 , Study no: 2

Cover Type	Nested Frequency '98	Average Cover % '85	'91	'98
Vegetation	188	3.00	4.25	29.79
Rock	161	.75	3.25	3.83
Pavement	339	58.50	48.75	43.54
Litter	355	29.25	24.25	26.39
Cryptogams	5	0	.25	.15
Bare Ground	302	8.50	19.25	21.88

SOIL ANALYSIS DATA --
Herd Unit 22, Study # 02, Study Name: Piute Reservoir

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%0M	PPM P	PPM K	dS/m
14.2	71.6 (14.1)	7.3	68.0	17.4	14.6	3.9	16.2	332.8	.9



PELLET GROUP FREQUENCY --
Herd unit 22 , Study no: 2

Type	Quadrat Frequency '98
Rabbit	11
Deer	6

BROWSE CHARACTERISTICS --
Herd unit 22 , Study no: 2

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Amelanchier utahensis																		
D	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	00%	00%	00%	
'91	00%	00%	00%	
'98	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'85	0	Dec:	0%
	'91	0		0%
	'98	20		100%

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Artemisia tridentata wyomingensis																		
S	85	40	1	-	-	-	-	-	-	-	41	-	-	-	2733			41
	91	1	-	-	-	-	-	-	-	-	1	-	-	-	66			1
	98	7	-	-	-	-	-	-	-	-	7	-	-	-	140			7
Y	85	27	7	1	-	-	-	-	-	-	34	-	1	-	2333			35
	91	25	9	4	1	-	-	1	-	-	29	-	5	6	2666			40
	98	14	11	-	-	-	-	-	-	-	23	-	2	-	500			25
M	85	12	28	8	-	-	-	-	-	-	48	-	-	-	3200	20	24	48
	91	1	12	10	3	2	1	-	-	-	18	3	8	-	1933	18	25	29
	98	53	42	3	2	2	-	-	-	-	101	-	1	-	2040	20	33	102
D	85	4	15	-	-	-	-	-	-	-	17	-	2	-	1266			19
	91	1	12	15	2	3	-	2	-	-	17	5	11	2	2333			35
	98	23	23	5	-	-	-	-	-	-	27	-	-	24	1020			51
X	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	340			17

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	49%	09%	03%	
'91	37%	29%	31%	+ 2%
'98	44%	04%	15%	-49%

Total Plants/Acre (excluding Dead & Seedlings)				
	'85	6799	Dec:	19%
	'91	6932		34%
	'98	3560		29%

Cercocarpus ledifolius																		
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	91	-	1	-	-	-	-	-	-	-	1	-	-	-	66	11	5	1
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	00%	00%	00%	
'91	100%	00%	00%	
'98	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'85	0	Dec:	-
	'91	66		-
	'98	0		-

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Chrysothamnus viscidiflorus stenophyllus																		
S	85	151	-	-	-	-	-	-	-	-	151	-	-	-	10066			151
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	13	-	-	-	-	-	-	-	-	13	-	-	-	260			13
Y	85	12	-	-	-	-	-	-	-	-	11	-	1	-	800			12
	91	1	-	-	8	-	-	3	-	-	11	-	-	1	800			12
	98	11	-	-	1	-	-	-	-	-	12	-	-	-	240			12
M	85	10	3	1	-	-	-	-	-	-	14	-	-	-	933	13	9	14
	91	8	-	-	10	-	-	3	-	-	20	1	-	-	1400	12	8	21
	98	107	-	3	20	-	-	3	-	-	129	4	-	-	2660	12	13	133
D	85	2	1	3	-	-	-	-	-	-	6	-	-	-	400			6
	91	-	-	1	-	-	-	-	-	-	-	-	-	1	66			1
	98	25	-	-	-	-	-	-	-	-	17	-	-	8	500			25
X	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	1	-	-	-	-	-	-	-	-	-	-	-	-	20			1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	13%	13%	03%	+ 6%
'91	00%	03%	06%	+33%
'98	00%	02%	05%	

Total Plants/Acre (excluding Dead & Seedlings)				
'85	2133	Dec:		19%
'91	2266			3%
'98	3400			15%

Juniperus osteosperma																		
S	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	00%	00%	00%	
'91	00%	00%	00%	
'98	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)			
'85	0	Dec:	-
'91	0		-
'98	0		-

Opuntia spp.																		
M	85	1	-	-	-	-	-	-	-	-	1	-	-	-	66	5	9	1
	91	1	-	-	-	-	-	-	-	-	1	-	-	-	66	5	8	1
	98	-	-	-	1	-	-	-	-	-	1	-	-	-	20	-	-	1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	00%	00%	00%	+ 0%
'91	00%	00%	00%	-70%
'98	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)			
'85	66	Dec:	-
'91	66		-
'98	20		-

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Pinus edulis																		
Y	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	98	1	-	-	-	-	-	-	-	-	1	-	-	-	20	-	-	1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor
'85	00%	00%	00%
'91	00%	00%	00%
'98	00%	00%	00%

%Change

Total Plants/Acre (excluding Dead & Seedlings)				
	'85	0	Dec:	-
	'91	0		-
	'98	40		-

Trend Study 22-3-98

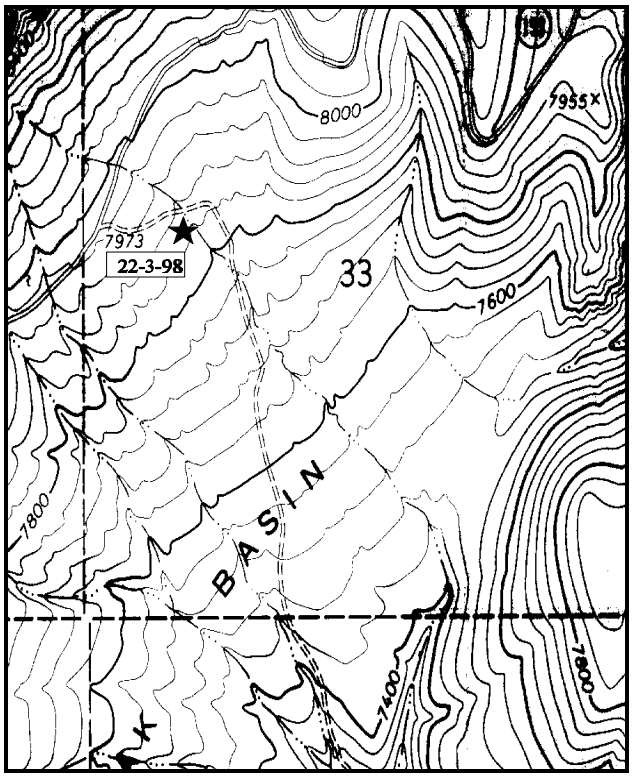
Study site name: Oak Basin . Range type: Chained, Railed Shrubland .

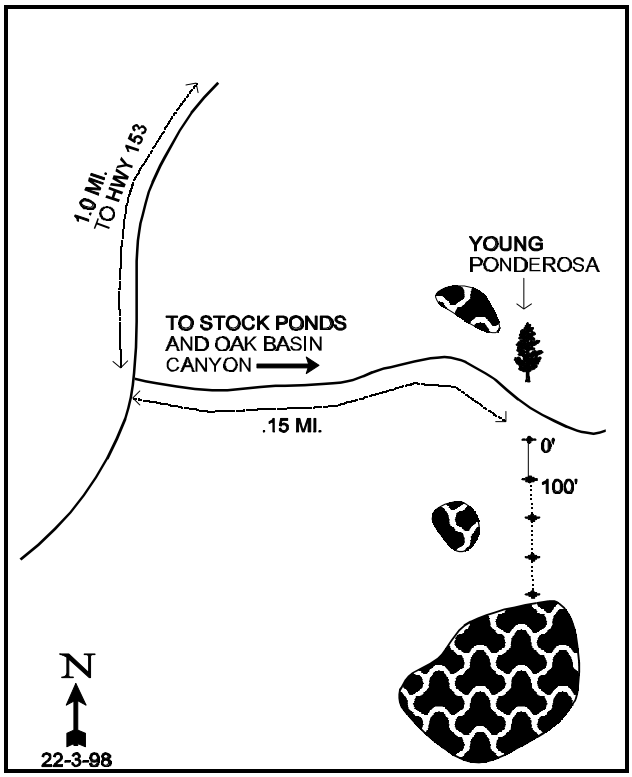
Compass bearing: frequency baseline 180 degrees.

Footmark (first frame placement) 5 feet. Frequency belt placement; line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

LOCATION DESCRIPTION

From the center of Junction in Piute County, turn west on Highway 153. Proceed 5.8 miles to a fork in the road. Turn left. Continue on Highway 153 for 1.75 miles to an intersection at mile marker 34. (An Interagency pellet transect begins here and parallels the left fork on the west side.) Take the left fork and go just under 1 mile to another fork. Turn left and go 0.15 miles to a lone Ponderosa Pine 15 feet to the left of the road. The baseline starts 100 feet south of the pine. The 0-foot stake is a steel rebar tagged #7044.





Map Name: Circleville, Utah Diagrammatic Sketch

Township 29S , Range 4W , Section 33 UTM 4233610.836 N, 384258.226 E

DISCUSSION

Trend Study No. 22-3 (49-3)

The Oak basin trend transect is located in Oak Basin approximately 5 miles northeast of Circleville, Utah. The slope is 20-25% with a southeast aspect and an elevation of 7,800 feet. The study is part of a 600-acre tract that was dixie harrowed and seeded in 1965. Deer use the area as spring-fall range and during light winters. The Circleville Cattle Allotment is on a 3 year rest rotation system. In the first year 360 cattle graze the area from June 1 to July 24. In the second year 360 cattle graze from July 24 through October 15. The pasture is then rested in the third year. Oak Basin pellet group transect is located 200 to 300 feet higher in elevation and about ½ mile to the north. Deer days use/acre rose from 13 in 1976-77 to 42 in 1984-85 with 5-year averages of 16 deer days between 1976 and 1981 and 75 deer days between 1981 and 1985 (Jense et al. 1985). The trend for deer days use/acre appears stable from 1985-86 through 1991-92 with an average of 28 (Jense et al. 1991). Pellet group data was not collected in 1992-93, but beginning in 1993-94, there was an obvious decline in use patterns with average days use/acre dropping to an average of 4 between 1993-94 through 1996-97 (Evans et al. 1997). A pellet group transect read on the site in 1998 indicated 39 deer days use/acre and 75 cow days use/acre in 1998. Jackrabbits, cottontail rabbits, sage grouse, and blue grouse can be found nearby.

Soil textural analysis indicates a sandy clay loam with a slightly acidic pH (6.3). The average effective rooting depth (see methods) is almost 9 inches with an average soil temperature of 61.2°F at 12 inches. Parent material is metamorphic rock originating from the cliffs west of the transect. In 1985, there was 6% bare ground which then increased to 18% in 1991. Currently, percent bare ground is about 10%. Percent litter is steadily decreasing while percent rock and pavement cover combined have changed little. In 1998, no signs of erosion were noted and the soil appeared to be building. Many of the changes shown on most all of the measured parameters was brought about by a fire that had gone through the site prior to 1991.

Mountain big sagebrush is the key species and the most prominent plants on the site. In 1985, the age structure of this species indicated a maturing population since seedlings and young plants account for only 1% and 10% respectively of the total. All plants were vigorous and hedging was light to moderate depending on the ecotypic variation of individual plants. Due to a fire that burned through the site between 1985 and 1991, there were no mountain big sagebrush plants encountered in the density plots in 1991. The population has since returned with an estimated density of 1,240 in 1998. Sixty percent of the plants were classified as mature, 26% young, and 1% seedlings. Utilization is currently light to moderate with few plants exhibiting poor vigor.

Next in importance is antelope bitterbrush and Gambel oak. The bitterbrush is scattered throughout the site with an estimated density of 120 plants/acre in 1998. In 1991, there were no bitterbrush plants encountered due to the fire. Although utilization is currently heavy, the bitterbrush are vigorous and healthy. The Gambel oak population was drastically reduced from 15,799 plants/acre in 1985 and 9,066 plants/acre in 1991, to a current estimated density of 520 plants/acre due to the fire. This is now a young population with good vigor. The remainder of the browse species are relatively unimportant in terms of total production, but add diversity and offer variety to the deer diet.

Ten grasses were encountered on the site in 1998. Intermediate wheatgrass and crested wheatgrass, two seeded species, were the most abundant and together account for 94% of the grass cover. Also important are two native species, muttongrass and Letterman needlegrass. Most had sustained moderate utilization from the cattle which were present when the transect was read in 1998. The grasses under the canopy of browse plants received the lightest use, while those in the interspaces were generally clipped to within a few inches of the ground. Perennial grass sum of nested frequency has declined over all years from 760 in 1985, to 646 in 1991, and finally 601 in 1998.

Ten forb species were observed on the site in 1998. Silvery lupine is currently the most abundant providing 94% of the forb cover. Most other species are sparse in the area. Use of these forbs by cattle was light, however the forbs, especially the lupine, are unquestionably important in the spring and summer deer diet.

1985 APPARENT TREND ASSESSMENT

The soil is well protected and building, with no indication of erosion problems. Vegetative trend was influenced by the seeding project in 1965. Species diversity is good and there is a healthy balance between the grass, forb, and shrub components. With the exception of spreading patches of Gambel oak, the community appears stable at present. In the long-term, the browse species can be expected to slowly decline unless reproduction increases.

1991 TREND ASSESSMENT

Because of a recent wildfire, the soil trend has changed dramatically since 1985. Percent bare ground has increased from 6% to 18% and percent litter has decreased substantially. Trend is down and should be watched closely. Browse trend is obviously down with the loss of all browse except for Gambel oak and pricklypear cactus to the fire. The herbaceous understory trend is slightly downward. Of the 29 species encountered, 14 show downward trends. Even with crested wheatgrass and intermediate wheatgrass with quadrat frequencies of 67 and 99 respectively, the overall trend with the effects of long-term drought and a relatively recent fire is slightly down.

TREND ASSESSMENT
soil - down
browse - down, loss of browse to wildfire
herbaceous understory - slightly down, have not yet recovered from the fire

1998 TREND ASSESSMENT

The soil trend is slightly upward with a decrease in percent bare ground cover. There currently appears to be adequate vegetation and litter cover to protect the soil from accelerated erosion. Percent rock and litter cover have stayed relatively the same over all years. The browse trend is upward with the recovery of mountain big sagebrush after the fire. The population appears healthy, although few seedling plants were encountered in 1998. Utilization is light to moderate with a percent decadency of 15%. The herbaceous understory trend is downward. Perennial herbaceous understory sum of nested frequency has continually declined from 873 in 1985, to 809 in 1991, and finally 704 in 1998.

TREND ASSESSMENT
soil - slightly upward
browse - upward
herbaceous understory - downward

HERBACEOUS TRENDS --
Herd unit 22 , Study no: 3

Type	Species	Nested Frequency '85	Nested Frequency '91	Nested Frequency '98	Quadrat Frequency '85	Quadrat Frequency '91	Quadrat Frequency '98	Average Cover % '98
G	Agropyron cristatum	$_{b}$221	$_{a}$169	$_{ab}$176	79	67	71	4.73
G	Agropyron intermedium	$_{ab}$316	$_{a}$303	$_{b}$326	98	99	95	20.23
G	Agropyron trachycaulum	-	4	-	-	2	-	-
G	Bouteloua gracilis	4	2	1	2	1	1	.03
G	Bromus inermis	$_{b}$16	$_{a}$-	$_{b}$12	7	-	4	.16
G	Carex spp.	34	24	26	19	16	13	.55
G	Elymus junceus	$_{b}$10	$_{a}$-	$_{a}$-	5	-	-	-
G	Koeleria cristata	1	3	-	1	1	-	-
G	Oryzopsis hymenoides	-	-	3	-	-	1	.00
G	Poa fendleriana	$_{b}$127	$_{b}$102	$_{a}$28	52	44	13	.33
G	Poa pratensis	8	-	3	3	-	1	.00
G	Sitanion hystrix	1	1	2	1	1	1	.00
G	Stipa comata	3	7	-	1	3	-	-
G	Stipa lettermani	19	31	24	10	13	9	.46
Total for Annual Grasses		0	0	0	0	0	0	0
Total for Perennial Grasses		760	646	601	278	247	209	26.53
Total for Grasses		760	646	601	278	247	209	26.53
F	Agoseris glauca	$_{a}$-	$_{b}$13	$_{ab}$9	-	6	3	.01
F	Arabis spp.	$_{a}$-	$_{b}$16	$_{a}$-	-	7	-	-
F	Astragalus convallarius	$_{ab}$6	$_{b}$7	$_{a}$-	3	5	-	-
F	Astragalus spp.	4	-	6	2	-	3	.16
F	Castilleja chromosa	$_{b}$10	$_{b}$14	$_{a}$-	6	6	-	-
F	Calochortus nuttallii	2	9	3	1	5	1	.00
F	Chenopodium album (a)	-	8	-	-	3	-	-
F	Cryptantha spp.	5	-	-	3	-	-	-
F	Eriogonum racemosum	5	6	2	4	4	1	.03
F	Hackelia patens	-	2	2	-	1	1	.00
F	Lactuca serriola	-	-	4	-	-	2	.01
F	Lomatium spp.	-	2	-	-	1	-	-
F	Lotus utahensis	$_{b}$12	$_{a}$4	$_{a}$-	6	2	-	-
F	Lupinus argenteus	$_{a}$45	$_{ab}$50	$_{b}$70	19	28	34	7.11
F	Medicago sativa	4	1	4	2	1	2	.06
F	Phlox longifolia	$_{a}$12	$_{b}$33	$_{a}$3	7	19	2	.01
F	Polygonum douglasii (a)	-	-	47	-	-	17	.16
F	Zigadenus paniculatus	$_{b}$8	$_{ab}$6	$_{a}$-	4	2	-	-
Total for Annual Forbs		0	8	47	0	3	17	0.15
Total for Perennial Forbs		113	163	103	57	87	49	7.41

Type	Species	Nested Frequency '85	'91	'98	Quadrat Frequency '85	'91	'98	Average Cover % '98
Total for Forbs		113	171	150	57	90	66	7.57

Values with different subscript letters are significantly different at % = 0.10 (annuals excluded)

BROWSE TRENDS --
Herd unit 22 , Study no: 3

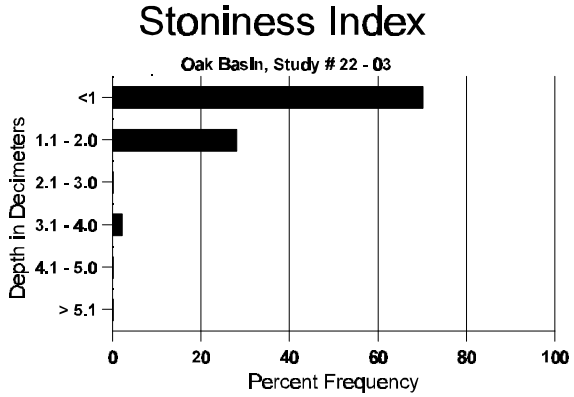
Type	Species	Strip Frequency '98	Average Cover % '98
B	Artemisia nova	0	-
B	Artemisia tridentata tridentata	0	-
B	Artemisia tridentata vaseyana	41	3.79
B	Cercocarpus ledifolius	0	.15
B	Chrysothamnus depressus	0	-
B	Chrysothamnus viscidiflorus	1	-
B	Juniperus osteosperma	2	.85
B	Opuntia spp.	6	.36
B	Purshia tridentata	6	.18
B	Quercus gambelii	7	.21
Total for Browse		63	5.54

BASIC COVER --
Herd unit 22 , Study no: 3

Cover Type	Nested Frequency '98	Average Cover % '85	'91	'98
Vegetation	356	7.50	7.25	46.47
Rock	232	17.75	20.25	19.61
Pavement	133	2.00	1.00	1.47
Litter	377	66.50	53.75	48.23
Cryptogams	11	0	.25	.05
Bare Ground	233	6.25	17.50	9.83

SOIL ANALYSIS DATA --
Herd Unit 22, Study # 03, Study Name: Oak Basin

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%0M	PPM P	PPM K	dS/m
8.5	61.2 (11.6)	6.3	70.0	9.4	20.6	3.9	16.2	332.8	.9



PELLET GROUP FREQUENCY --
Herd unit 22 , Study no: 3

Type	Quadrat Frequency '98
Rabbit	5
Elk	1
Deer	25
Cattle	17

BROWSE CHARACTERISTICS --
Herd unit 22 , Study no: 3

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Artemisia nova																		
D	85	-	1	-	-	-	-	-	-	-	1	-	-	-	66			1
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor
'85	100%	00%	00%
'91	00%	00%	00%
'98	00%	00%	00%

%Change

Total Plants/Acre (excluding Dead & Seedlings)				
'85	66	Dec:		100%
'91	0			0%
'98	0			0%

Artemisia tridentata tridentata																			
M	85	-	2	-	-	-	-	-	-	-	2	-	-	-	133	30	26	2
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor
'85	100%	00%	00%
'91	00%	00%	00%
'98	00%	00%	00%

%Change

Total Plants/Acre (excluding Dead & Seedlings)			
'85	133	Dec:	-
'91	0		-
'98	0		-

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Artemisia tridentata vaseyana																		
S	85	1	-	-	-	-	-	-	-	-	1	-	-	-	66			1
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	-	-	-	1	-	-	-	-	-	1	-	-	-	20			1
Y	85	6	1	1	-	-	-	-	-	-	8	-	-	-	533			8
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	10	4	-	2	-	-	-	-	-	16	-	-	-	320			16
M	85	24	11	6	-	-	-	-	-	-	41	-	-	-	2733	20	19	41
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	98	28	9	-	-	-	-	-	-	-	37	-	-	-	740	21	26	37
D	85	7	16	5	-	-	-	-	-	-	28	-	-	-	1866			28
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	3	6	-	-	-	-	-	-	-	7	-	-	2	180			9
X	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	300			15

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor
'85	36%	16%	00%
'91	00%	00%	00%
'98	31%	00%	03%

%Change

Total Plants/Acre (excluding Dead & Seedlings)				
	'85	5132	Dec:	36%
	'91	0		0%
	'98	1240		15%

Cercocarpus ledifolius																		
Y	85	3	-	-	-	-	-	-	-	-	3	-	-	-	200			3
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor
'85	00%	00%	00%
'91	00%	00%	00%
'98	00%	00%	00%

%Change

Total Plants/Acre (excluding Dead & Seedlings)				
	'85	200	Dec:	-
	'91	0		-
	'98	0		-

Chrysothamnus depressus																		
M	85	1	-	-	-	-	-	-	-	-	1	-	-	-	66	6	6	1
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor
'85	00%	00%	00%
'91	00%	00%	00%
'98	00%	00%	00%

%Change

Total Plants/Acre (excluding Dead & Seedlings)				
	'85	66	Dec:	-
	'91	0		-
	'98	0		-

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Chrysothamnus viscidiflorus																		
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	98	1	-	-	-	-	-	-	-	-	1	-	-	-	20	6	10	1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	00%	00%	00%	
'91	00%	00%	00%	
'98	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
'85	0	Dec:		-
'91	0			-
'98	20			-

Juniperus osteosperma																		
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	98	2	-	-	-	-	-	-	-	-	2	-	-	-	40	-	-	2

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	00%	00%	00%	
'91	00%	00%	00%	
'98	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
'85	0	Dec:		-
'91	0			-
'98	40			-

Opuntia spp.																		
S	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
Y	85	1	-	-	-	-	-	-	-	-	1	-	-	-	66			1
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	91	1	-	-	-	-	-	-	-	-	-	-	1	-	66	9	16	1
	98	6	-	-	-	-	-	-	-	-	6	-	-	-	120	7	12	6
D	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	1	-	-	-	-	-	-	-	-	-	1	-	-	20			1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	00%	00%	00%	+ 0%
'91	00%	00%	100%	+53%
'98	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)			
'85	66	Dec:	0%
'91	66		0%
'98	140		14%

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Purshia tridentata																		
Y	85	-	1	-	-	-	-	-	-	-	1	-	-	-	66			1
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	85	-	3	2	-	-	-	-	-	-	5	-	-	-	333	18	20	5
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	98	-	-	3	-	-	3	-	-	-	6	-	-	-	120	11	26	6
D	85	-	1	-	-	-	-	-	-	-	1	-	-	-	66			1
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	71%	29%	00%	
'91	00%	00%	00%	
'98	00%	100%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'85	465	Dec:	14%
	'91	0		0%
	'98	120		0%

Quercus gambelii																		
S	85	34	-	-	-	-	-	-	-	-	34	-	-	-	2266			34
	91	78	-	-	-	-	-	8	-	-	86	-	-	-	5733			86
	98	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
Y	85	200	-	-	-	-	-	-	-	-	194	4	2	-	13333			200
	91	135	-	-	1	-	-	-	-	-	136	-	-	-	9066			136
	98	13	3	-	-	-	-	-	-	-	16	-	-	-	320			16
M	85	21	9	-	-	-	-	-	-	-	27	3	-	-	2000	33	14	30
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	98	2	8	-	-	-	-	-	-	-	10	-	-	-	200	24	24	10
D	85	4	3	-	-	-	-	-	-	-	3	1	3	-	466			7
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
X	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	20			1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	05%	00%	02%	-43%
'91	00%	00%	00%	-94%
'98	42%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'85	15799	Dec:	3%
	'91	9066		0%
	'98	520		0%

Trend Study 22-4-98

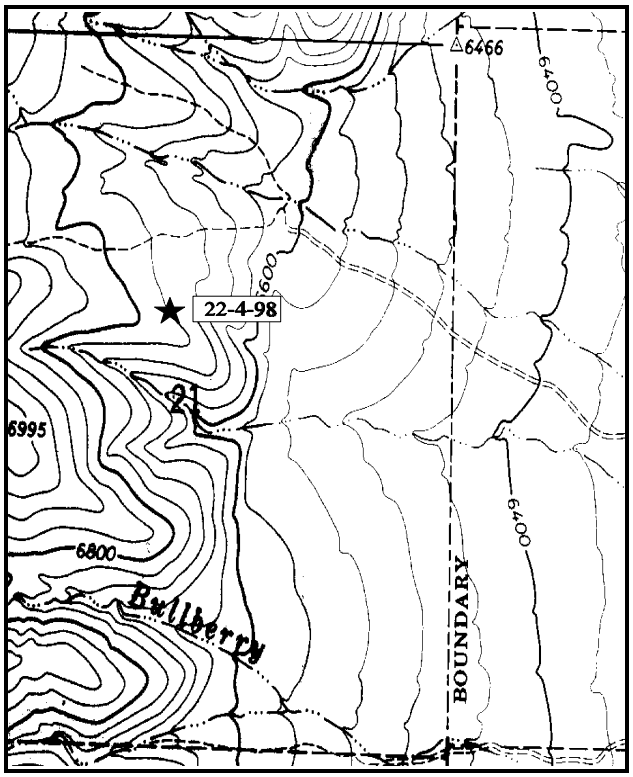
Study site name: Wades Canyon . Range type: Big Sagebrush-Grass .

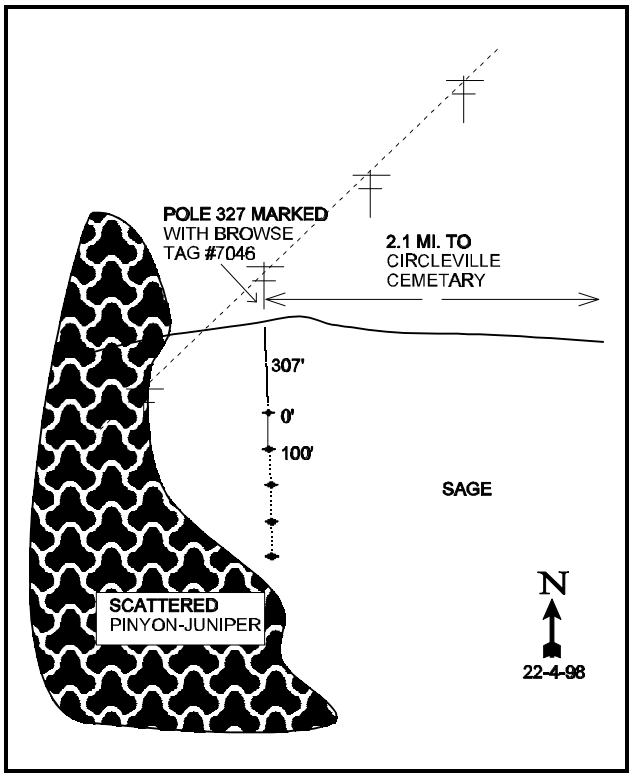
Compass bearing: frequency baseline 180 degrees.

Footmark (first frame placement) 5 feet. Frequency belt placement; line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

LOCATION DESCRIPTION

From mile marker 161 on US 89, north of Circleville, drive south 1/2 mile to a dirt road. Turn west and go 1.55 miles through the north end of Circleville to a jog in the road. Continue west past the jog 0.15 miles to the Circleville cemetery. Drive around the cemetery to the northeast corner. From the corner, a faint road takes off at a 45-degree angle to the northwest. Proceed up this road 2.1 miles to the point where it crosses under a high tension powerline. Stop here. The pole (# 327) nearest the road has a red browse tag #7046 attached under a yellow reflector. Walk 300 feet due south to the first frequency baseline stake. The 0-foot stake is a 2-1/2 foot tall rebar tagged #7045. There is an unmarked pellet group transect here also.





Map Name: Circleville, Utah

Diagrammatic Sketch

Township 30S , Range 4W , Section 21

UTM 4227352.251 N, 384705.478 E

DISCUSSION
Trend Study No. 22-4 (49-4)

The Wades Canyon trend study is located northwest of Circleville just inside the Forest Service boundary at an elevation of 6,600 feet. Slope is 10-12% with an east aspect. The vegetation type is sagebrush-grass, but pinyon-juniper are encroaching onto the site. The Wades Canyon pellet group transect, which is located near the trend site, show that deer use increased from 3 deer days use/acre in 1976-77 to 17 in 1980-81, with a 5-year mean of 12. It then increased to 31 in 1984-85, with a 5-year average between 1981 and 1985 of 24 deer days use/acre (Jense et al. 1985). Between 1986 and 1990, it continued to increase with an average 27 deer days use/acre. It appears that 1990 was the last time the pellet group transect was read. A pellet group transect read on the site in 1998 indicates 42 deer days use/acre and <1 cow days use/acre.

Soil textural analysis indicates a loam soil with a neutral pH (7.1). The average effective rooting depth (see methods) is 11 inches with an average temperature of 62°F measured at a depth of 12 inches. A dense hardpan is found at a depth of about 10-12 inches. Vegetative growth may be limited due to relatively low amounts of phosphorous (8.8 ppm) where 10 ppm is considered necessary for normal plant growth. The soil's water holding capacity is poor. Some soil movement is detectable, but the negligible slope reduces the potential for serious erosion problems.

Wyoming big sagebrush is the principal key species with a density of 2,920 plants/acre and providing 52% of the browse cover in 1998. The Wyoming big sagebrush population is currently in poor health. Although the intensity of utilization has decreased, percent decadence continues to increase and currently accounts for 61% of the population. The percentage of decadent plants classified as dying has also increased since 1991. It is now up to 67% in 1998. In 1991, most of the sagebrush was given a good vigor rating (conversely 31% were given a poor vigor rating) even though they displayed a clubbed appearance and few seed stalks were being produced. Because of the much larger sample size utilized in 1998, the estimated density for sagebrush was shown to decrease substantially. The number of dead plants in the population can explain about 40% of the decrease, the remainder would not be actual losses, but the larger sample giving improved accuracy for estimating clumped and/or discontinuous shrub populations. Also in 1985, it was reported that surrounding the Circleville dump, located between Circleville and the transect, there was an extensive area (1-2 square miles) where the sagebrush appeared very sick. Except for a healthy-looking row on either side of the road, these plants appeared to have lost most of their leaves and were just starting to grow new ones. This could have been due to a Rouga moth infestation.

Narrowleaf low rabbitbrush is the most abundant browse plant at 4,840 plants/acre in 1998, yet only provides 38% of the browse cover. However on average, these plants are half the size of the sagebrush and are generally less preferred by deer and livestock. Broom snakeweed density shows a slight increase in density to 1,680 plants/acre, which coincides with the poor health of the Wyoming sagebrush population. Prickly pear cactus is also present but in low abundance. Point-centered quarter data indicates 57 pinyon trees/acre and 47 Utah juniper trees/acre in 1998.

Indian ricegrass and bottlebrush squirreltail are the only perennial grasses on the site. Bottlebrush squirreltail nested frequency has significantly increased since 1991. Perennial grass sum of nested frequency has increased over all years from 201 in 1985, to 217 in 1991, and 334 in 1998. Only six forbs were found in 1991 and 1998. Prickly phlox and low fleabane are the most abundant forbs and comprise 96% of the forb cover. The herbaceous vegetation is more common under the browse canopy than in the openings, indicating heavy grazing pressure. Perennial forb sum of nested frequency has steadily decreased over all years from 367 in 1985, to 290 in 1991, and finally 247 in 1998.

1985 APPARENT TREND ASSESSMENT

The soil appears stable due largely to the gentle slope. Trend in the vegetative community is stable to slightly downward. The sagebrush is receiving increasingly heavy use from wintering deer, and reproduction and vigor may be declining. Pinyons appear to be encroaching into the sagebrush flats.

1991 TREND ASSESSMENT

Since 1985, percent bare ground cover has increased from 8% to 14%. Percent litter, rock, and vegetation cover have all decreased. This indicates a slight downward trend for soil. This could turn around with an end to this extended drought we are now in. The two key browse species are Wyoming big sagebrush and low rabbitbrush. They have both experienced increases in their respective densities, but percent decadency for sagebrush is high at 47%. The trend for browse is slightly downward. The herbaceous understory has for the most part declined since 1985, with only 3 of 12 species having shown any stability or increase.

TREND ASSESSMENT
soil - slightly downward
browse - slightly downward
herbaceous understory - slightly downward

1998 TREND ASSESSMENT

The soil trend is slightly upward with an increase in percent litter cover and a decrease in percent bare ground. Erosion potential is low due to the relative levelness of the site. The browse trend is downward with the health of the Wyoming big sagebrush population continuing to deteriorate. There is an increase in percent decadency and the percentage of plants classified as dying. Currently, there are 3 live plants for every 1 dead encountered. It appears that this will continue to increase in the future. The herbaceous understory trend is stable. Grass sum of nested frequency has increased while forb sum of nested frequency has decreased. Overall, herbaceous sum of nested frequency values are similar over all years.

TREND ASSESSMENT
soil - slightly upward
browse - downward
herbaceous understory - stable

HERBACEOUS TRENDS --
Herd unit 22 , Study no: 4

Type	Species	Nested Frequency '85	'91	'98	Quadrat Frequency '85	'91	'98	Average Cover % '98
G	Bromus tectorum (a)	-	-	1	-	-	1	.00
G	Oryzopsis hymenoides	138	133	150	63	62	63	5.26
G	Sitanion hystrix	a63	a84	b184	34	42	73	7.67
Total for Annual Grasses		0	0	1	0	0	1	0.00
Total for Perennial Grasses		201	217	334	97	104	136	12.94
Total for Grasses		201	217	335	97	104	137	12.94
F	Arabis spp.	-	4	-	-	2	-	-
F	Astragalus calycosus	b46	b62	a12	22	27	7	.08
F	Castilleja chromosa	b15	a-	a-	8	-	-	-
F	Chaenactis douglasii	b28	a9	a3	17	5	1	.00
F	Erigeron pumilus	b150	a95	ab118	65	42	54	1.21
F	Physaria chambersii	b36	a-	a3	17	-	2	.01

Type	Species	Nested Frequency '85	'91	'98	Quadrat Frequency '85	'91	'98	Average Cover % '98
F	Phlox hoodii	$_{a}$72	$_{b}$99	$_{ab}$82	35	46	31	2.44
F	Physaria spp.	$_{a}$-	$_{b}$21	$_{b}$29	-	12	13	.09
F	Thlaspi montanum	$_{b}$19	$_{a}$-	$_{a}$-	11	-	-	-
F	Unknown forb-perennial	1	-	-	1	-	-	-
Total for Annual Forbs		0	0	0	0	0	0	0
Total for Perennial Forbs		367	290	247	176	134	108	3.84
Total for Forbs		367	290	247	176	134	108	3.84

Values with different subscript letters are significantly different at % = 0.10 (annuals excluded)

BROWSE TRENDS --
Herd unit 22 , Study no: 4

Type	Species	Strip Frequency '98	Average Cover % '98
B	Artemisia tridentata wyomingensis	76	11.38
B	Chrysothamnus viscidiflorus stenophyllus	73	8.23
B	Gutierrezia sarothrae	36	.79
B	Juniperus osteosperma	2	.78
B	Opuntia spp.	2	.03
B	Pinus edulis	2	.63
Total for Browse		191	21.85

CANOPY COVER --
Herd unit 22 , Study no: 4

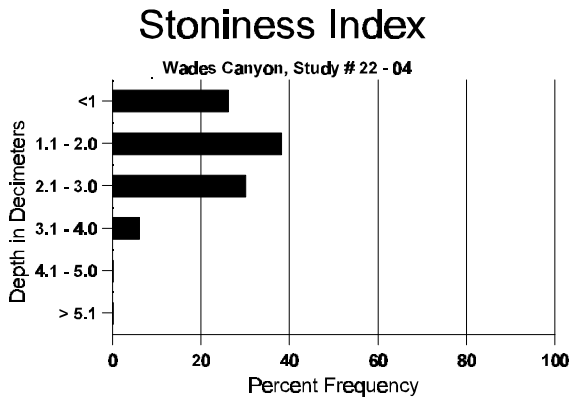
Species	Percent Cover '98
Pinus edulis	1

BASIC COVER --
Herd unit 22 , Study no: 4

Cover Type	Nested Frequency '98	Average Cover % '85	'91	'98
Vegetation	310	6.25	5.25	34.92
Rock	271	21.25	17.75	17.62
Pavement	316	39.75	41.50	30.56
Litter	371	25.00	17.25	26.46
Cryptogams	82	.25	4.75	2.44
Bare Ground	224	7.50	13.50	6.94

SOIL ANALYSIS DATA --
Herd Unit 22, Study # 04, Study Name: Wades Canyon

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%0M	PPM P	PPM K	dS/m
11.0	62.0 (12.2)	7.1	42.0	31.4	26.6	3.0	8.8	96.0	.7



PELLET GROUP FREQUENCY --
Herd unit 22 , Study no: 4

Type	Quadrat Frequency '98
Rabbit	18
Deer	24

BROWSE CHARACTERISTICS --
Herd unit 22 , Study no: 4

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Artemisia tridentata wyomingensis																		
S	85	1	-	-	-	-	-	-	-	-	1	-	-	-	66			1
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	3	-	-	-	-	-	-	-	-	3	-	-	-	60			3
Y	85	7	3	-	-	-	-	-	-	-	10	-	-	-	666			10
	91	4	4	3	-	-	-	-	-	-	11	-	-	-	733			11
	98	7	3	-	1	-	-	1	-	-	9	-	2	1	240			12
M	85	5	23	5	-	-	-	-	-	-	32	-	1	-	2200	20	24	33
	91	1	9	11	1	2	8	-	-	-	26	5	1	-	2133	17	22	32
	98	29	14	-	2	-	-	-	-	-	24	-	21	-	900	19	27	45
D	85	3	14	9	-	-	-	-	-	-	23	-	3	-	1733			26
	91	2	3	5	1	4	23	-	-	-	10	4	1	23	2533			38
	98	58	21	6	4	-	-	-	-	-	15	4	10	60	1780			89
X	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	1000			50

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	58%	20%	06%	+15%
'91	27%	62%	31%	-46%
'98	26%	04%	64%	

Total Plants/Acre (excluding Dead & Seedlings)				
'85	4599	Dec:		38%
'91	5399			47%
'98	2920			61%

Chrysothamnus viscidiflorus stenophyllus																		
Y	85	15	3	-	-	-	-	-	-	-	18	-	-	-	1200			18
	91	5	1	-	-	-	-	-	-	-	6	-	-	-	400			6
	98	18	-	-	-	-	-	-	-	-	16	-	-	2	360			18
M	85	69	5	-	-	-	-	-	-	-	74	-	-	-	4933	10	10	74
	91	2	19	52	10	7	5	1	-	-	96	-	-	-	6400	8	9	96
	98	202	3	-	5	-	-	2	-	-	209	3	-	-	4240	12	16	212
D	85	11	5	-	-	-	-	-	-	-	16	-	-	-	1066			16
	91	-	1	16	2	-	3	-	-	-	16	-	-	6	1466			22
	98	9	-	-	3	-	-	-	-	-	10	-	-	2	240			12
X	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	40			2

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	12%	00%	00%	+13%
'91	23%	61%	05%	-41%
'98	01%	00%	02%	

Total Plants/Acre (excluding Dead & Seedlings)				
'85	7199	Dec:		15%
'91	8266			18%
'98	4840			5%

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Gutierrezia sarothrae																		
Y	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	16	-	-	1	-	-	-	-	-	17	-	-	-	340			17
M	85	3	-	-	-	-	-	-	-	-	3	-	-	-	200	8	5	3
	91	4	-	1	-	-	-	-	-	-	5	-	-	-	333	7	6	5
	98	61	-	-	3	-	-	-	-	-	64	-	-	-	1280	8	9	64
D	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	3	-	-	-	-	-	-	-	-	-	-	1	2	60			3
X	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	80			4

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	00%	00%	00%	+40%
'91	00%	20%	00%	+80%
'98	00%	00%	04%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'85	200	Dec:	0%
	'91	333		0%
	'98	1680		4%

Juniperus osteosperma																		
Y	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	98	1	-	-	-	-	-	-	-	-	1	-	-	-	20	-	-	1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	00%	00%	00%	
'91	00%	00%	00%	
'98	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'85	0	Dec:	-
	'91	0		-
	'98	40		-

Opuntia spp.																		
Y	85	1	-	-	-	-	-	-	-	-	1	-	-	-	66			1
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	85	3	-	-	-	-	-	-	-	-	-	-	3	-	200	5	3	3
	91	2	-	-	-	-	-	-	-	-	2	-	-	-	133	5	9	2
	98	2	-	-	-	-	-	-	-	-	2	-	-	-	40	5	11	2

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	00%	00%	75%	-50%
'91	00%	00%	00%	-70%
'98	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'85	266	Dec:	-
	'91	133		-
	'98	40		-

Pinus edulis

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	98	2	-	-	-	-	-	-	-	-	2	-	-	-	40	-	-	2

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor
'85	00%	00%	00%
'91	00%	00%	00%
'98	00%	00%	00%

%Change

Total Plants/Acre (excluding Dead & Seedlings)				
	'85	0	Dec:	-
	'91	0		-
	'98	40		-

Trend Study 22-5-98

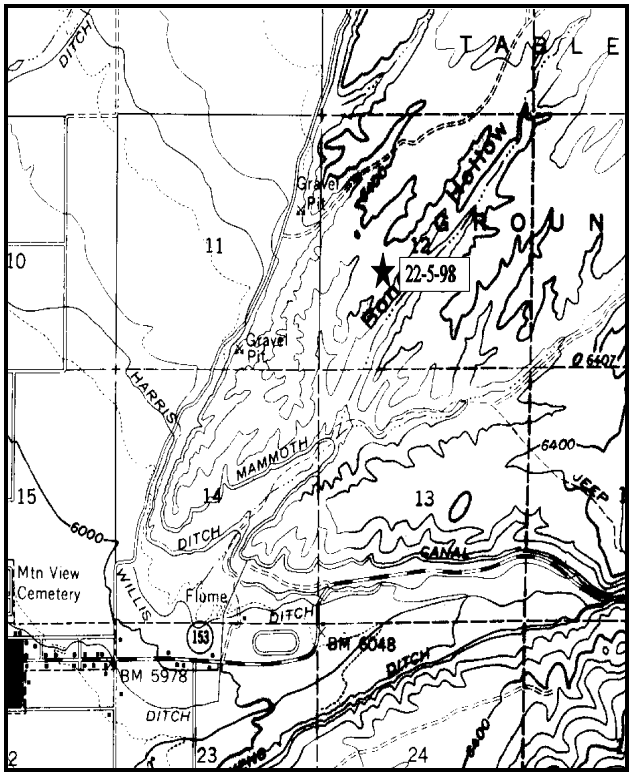
Study site name: Bone Hollow . Range type: Big Sagebrush-Grass .

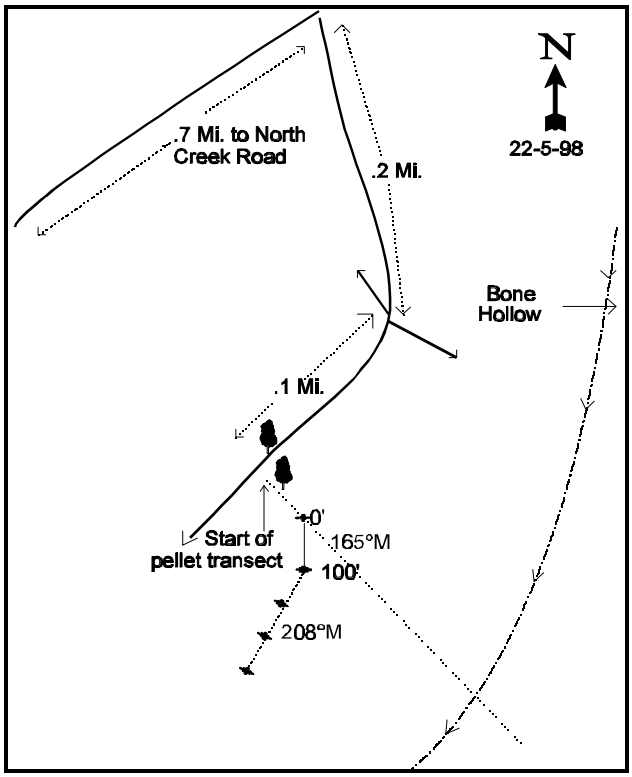
Compass bearing: frequency baseline 165 M degrees. Lines 2-4 208° M

Footmark (first frame placement) 5 feet. Frequency belt placement; line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

LOCATION DESCRIPTION

From the intersection of the North Creek Road and SR153 on the east side of Beaver, go north 1.95 miles past an irrigation pond on the left to a gravel pit on the right. On the south side of the gravel pit a good dirt road goes northeast up the bottom of a draw (ignore the numerous other small dirt roads). Drive up this road 0.75 miles to a fork. Turn right onto another major dirt road and go south 0.2 miles to another major right turn (there is also a left fork and a hard right). Go 0.1 miles west just past where the road goes closely between two junipers. Look for a fencepost 50 feet to the left. The fencepost marks the start of a pellet group transect. The pellet group transect is marked by short yellow rebar running southeast at 25-foot intervals. The frequency baseline starts between pellet stakes 3 and 4 and is marked by a 3-foot rebar tagged #7048.





Map Name: Beaver, Utah Diagrammatic Sketch

Township 29S , Range 7W , Section 12 UTM 4240484.709 N, 3604463463 E

DISCUSSION

Trend Study No. 22-5 (56A-1)

The Bone Hollow trend study samples an area of Wyoming big sagebrush and juniper administered by the BLM. The transect is located on a slight south facing slope at an elevation of 6,400 feet. This is typical of the untreated winter ranges on the benches above Beaver, which are historically important deer winter range. Deer use is moderate to heavy and varies somewhat from year to year depending on the winter weather. A pellet group transect read on the site in 1998 indicates 93 deer days use/acre.

The soil is moderately deep, fairly compacted, and very stony throughout. Average effective rooting depth (see methods) is estimated to be just over 12 inches with an average soil temperature of 49°F at almost 15 inches. Soil textural analysis indicates a sandy clay loam with a neutral pH (6.7). Plant development may be limited due to relatively low amounts of phosphorous (8.5 ppm). Past erosion is apparent with a high percentage of pavement (27%) and rock (6%) on the soil surface. Litter and herbaceous vegetation are found mostly under the sagebrush. The potential for continued erosion is high within the bare shrub interspaces.

A fairly dense and uniform stand of Wyoming big sagebrush, along with an open woodland of juniper and pinyon, gives this extensive area it's vegetative aspect. The Wyoming big sagebrush is the only desirable browse species present. The junipers provide good cover and many have been high-lined. Browsing pressure continues to be moderate to heavy on the sagebrush. Seed production appeared low in both 1991 and 1998. In 1985, the age structure indicated a relatively dynamic population with 22% of the plants classified as young and a biotic potential of 19% in 1985. In 1991, only 5% of the plants were young and the biotic potential was 0. Percent decadency increased from 30% in 1985 to 33% in 1991. Also, the percentage of plants classified as dying accounted for 57% of the decadent portion of the population. In 1998, the population still exhibits a downward trend with percent decadency again increasing to 35% of the population. Currently, utilization continues to be moderate to heavy with the plants generally in good vigor. With extended drought, this problem is intensified by the dominance of cheatgrass in the understory. At present, it almost makes up 80% of the herbaceous cover. Other browse species scattered throughout the site in low abundance include: broom snakeweed, narrowleaf low rabbitbrush, and prickly pear cactus. Point-centered quarter data collected in 1998 estimates 39 pinyon trees/acre and 149 Utah juniper trees/acre.

A variety of grass species are found on the site. The most abundant is cheatgrass which provides 79% of the herbaceous understory cover and 40% of the total vegetative cover. Cheatgrass was encountered in every quadrat in 1998, with a nested frequency value of 379 out of a possible 400. The most abundant perennial grasses are bottlebrush squirreltail and Indian ricegrass. Most of the grass species, whether abundant or not, are found under the protection of the sagebrush.

Forbs occur sporadically throughout the community. They are mostly small and contribute little forage in the spring. Current utilization is light. Perennial herbaceous understory sum of nested frequency has changed very little over all years.

1985 APPARENT TREND ASSESSMENT

The soil trend may be slightly downward with erosion occurring in the openings and slow soil building under browse plants. The vegetative composition and age structures indicate a stable Wyoming sagebrush/grass community with slow pinyon-juniper encroachment. Cool season herbaceous species are conspicuously absent as a result of constant heavy spring grazing in the past. A chaining could be used to restore the area to a more productive state, but the rockiness of the surface soil would limit the success of broadcast seeding unless the soil is sufficiently disturbed.

1991 TREND ASSESSMENT

The soil trend is still considered slightly downward. Vegetative basal cover is still low at 4%. Rock-pavement cover has decreased, with percent bare ground rising to 19% and percent litter cover decreasing to 40%. There is only one key browse species, Wyoming big sagebrush, which has a 4% increase in it's population density. The biotic potential has decreased and the young age class of plants has also decreased, but the percent of decadency is fairly stable and high. The percentage of plants classified as having poor vigor has more than doubled to 18%. The browse trend is slightly downward with the decline of the young age class and biotic potential. The trend for herbaceous understory is down as the sum of nested frequency is declining with the drought.

TREND ASSESSMENT
soil - slightly down
browse - slightly downward
herbaceous understory - down, poor condition

1998 TREND ASSESSMENT

The soil trend is stable. There does not appear to be accelerated erosion on the site at this time. Percent bare ground cover has declined since 1991, as well as combined percent rock and pavement cover. Percent litter cover has increased to 48% in 1998, although much of the litter is comprised of fine fuels contributed by cheatgrass. The browse trend is slightly downward. Percent decadency has increased since 1991. Although the percentage of dying plants has decreased, there are still many dying plants encountered and few seedling or young plants were encountered in 1998. The herbaceous understory trend is stable with little change in perennial herbaceous understory sum of nested frequency. Cheatgrass is dominate and could carry a catastrophic fire where all the browse would be lost.

TREND ASSESSMENT
soil - stable
browse - slightly downward
herbaceous understory - stable, but dominated by cheatgrass

HERBACEOUS TRENDS --
Herd unit 22 , Study no: 5

Type	Species	Nested Frequency '85	'91	'98	Quadrat Frequency '85	'91	'98	Average Cover % '98
G	Agropyron spicatum	1	3	1	1	1	1	.03
G	Bouteloua gracilis	1	-	12	1	-	4	.12
G	Bromus tectorum (a)	-	-	379	-	-	100	20.28
G	Oryzopsis hymenoides	50	35	34	22	20	16	1.51
G	Poa secunda	[a]-	[b]11	[a]2	-	6	1	.00
G	Sitanion hystrix	122	99	103	55	45	43	2.21
G	Stipa comata	9	12	11	4	5	6	.64
Total for Annual Grasses		0	0	379	0	0	100	20.28
Total for Perennial Grasses		183	160	163	83	77	71	4.52
Total for Grasses		183	160	542	83	77	171	24.80

Type	Species	Nested Frequency '85	'91	'98	Quadrat Frequency '85	'91	'98	Average Cover % '98
F	Agoseris glauca	$_{a}$5	$_{a}$5	$_{b}$17	2	3	7	.11
F	Alyssum alyssoides (a)	-	-	9	-	-	3	.01
F	Antennaria rosea	-	3	4	-	1	2	.01
F	Arabis demissa	1	1	5	1	1	3	.04
F	Astragalus spp.	$_{a}$-	$_{ab}$4	$_{b}$17	-	2	6	.10
F	Chaenactis douglasii	$_{a}$7	$_{b}$20	$_{a}$5	3	10	3	.01
F	Cryptantha spp.	10	20	-	5	9	-	-
F	Descurainia pinnata (a)	-	-	3	-	-	1	.00
F	Erigeron pumilus	$_{b}$10	$_{a}$-	$_{a}$3	6	-	1	.00
F	Leucelene ericoides	-	7	5	-	3	2	.03
F	Machaeranthera canescens	$_{b}$11	$_{a}$2	$_{a}$-	6	2	-	-
F	Microsteris gracilis (a)	-	-	1	-	-	1	.00
F	Phlox austromontana	$_{ab}$17	$_{a}$9	$_{b}$27	8	5	13	.23
F	Ranunculus testiculatus (a)	-	-	33	-	-	12	.16
F	Sphaeralcea coccinea	5	14	16	4	6	7	.22
Total for Annual Forbs		0	0	46	0	0	17	0.18
Total for Perennial Forbs		66	85	99	35	42	44	0.79
Total for Forbs		66	85	145	35	42	61	0.97

Values with different subscript letters are significantly different at % = 0.10 (annuals excluded)

BROWSE TRENDS --
Herd unit 22 , Study no: 5

Type	Species	Strip Frequency '98	Average Cover % '98
B	Amelanchier utahensis	-	.00
B	Artemisia tridentata wyomingensis	87	17.43
B	Chrysothamnus nauseosus	1	.03
	Chrysothamnus viscidiflorus stenophyllus	0	-
B	Gutierrezia sarothrae	4	.06
B	Juniperus osteosperma	11	4.32
B	Opuntia spp.	4	.03
B	Pinus edulis	2	2.65
B	Sclerocactus	1	-
Total for Browse		110	24.54

CANOPY COVER --
Herd unit 22 , Study no: 5

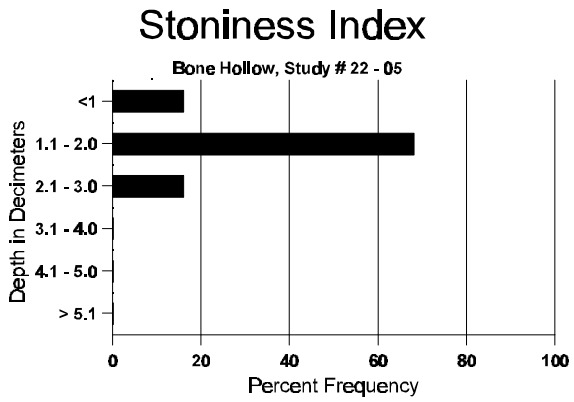
Species	Percent Cover '98
Juniperus osteosperma	9
Pinus edulis	2

BASIC COVER --
Herd unit 22 , Study no: 5

Cover Type	Nested Frequency '98	Average Cover % '85	'91	'98
Vegetation	381	3.75	3.75	41.04
Rock	190	1.75	2.25	6.06
Pavement	315	42.75	35.25	27.36
Litter	397	43.00	39.75	48.47
Cryptogams	23	0	.50	.26
Bare Ground	253	8.75	18.50	14.31

SOIL ANALYSIS DATA --
Herd Unit 22, Study # 05, Study Name: Bone Hollow

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%0M	PPM P	PPM K	dS/m
12.4	49.0 (14.9)	6.7	52.4	23.1	24.6	2.6	8.5	96.0	.7



PELLET GROUP FREQUENCY --
Herd unit 22 , Study no: 5

Type	Quadrat Frequency '98
Rabbit	34
Deer	66
Cattle	1

BROWSE CHARACTERISTICS --
Herd unit 22 , Study no: 5

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Artemisia tridentata wyomingensis																		
S	85	16	1	-	-	-	-	-	-	-	17	-	-	-	1133			17
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	4	-	-	-	-	-	-	-	-	4	-	-	-	80			4
Y	85	12	6	1	-	-	-	-	-	-	18	-	1	-	1266			19
	91	4	1	-	-	-	-	-	-	-	5	-	-	-	333			5
	98	9	1	-	-	-	-	-	-	-	10	-	-	-	200			10
M	85	13	22	8	-	-	-	-	-	-	42	-	1	-	2866	15	15	43
	91	13	31	11	2	-	-	-	-	-	56	1	-	-	3800	13	24	57
	98	29	94	14	-	6	-	-	-	-	141	-	-	-	2860	17	27	143
D	85	10	11	5	-	-	-	-	-	-	21	-	5	-	1733			26
	91	13	9	2	5	-	-	1	-	-	12	1	-	17	2000			30
	98	17	34	27	1	2	-	-	-	-	62	1	5	13	1620			81
X	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	-	2	-	-	-	-	-	-	-	2	-	-	-	680			34

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	44%	16%	08%	+ 4%
'91	45%	14%	18%	-24%
'98	59%	18%	08%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'85	5865	Dec:	30%
	'91	6133		33%
	'98	4680		35%

Chrysothamnus nauseosus																		
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	98	-	-	-	1	-	-	-	-	-	1	-	-	-	20	-	-	1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	00%	00%	00%	
'91	00%	00%	00%	
'98	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'85	0	Dec:	-
	'91	0		-
	'98	20		-

Chrysothamnus viscidiflorus stenophyllus																		
Y	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	1	-	-	-	-	-	-	-	1	-	-	-	66			1
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	00%	00%	00%	
'91	100%	00%	00%	
'98	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'85	0	Dec:	-
	'91	66		-
	'98	0		-

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Gutierrezia sarothrae																		
S	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	4	-	-	-	-	-	-	-	-	4	-	-	-	80			4
Y	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	2	-	-	-	-	-	-	-	-	2	-	-	-	133			2
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	98	5	-	-	-	-	-	-	-	-	5	-	-	-	100	7	9	5

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	00%	00%	00%	
'91	00%	00%	00%	-25%
'98	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'85	0	Dec:	-
	'91	133		-
	'98	100		-

Juniperus osteosperma																		
S	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	2	-	-	-	-	-	-	-	-	2	-	-	-	133			2
	98	8	-	-	1	-	-	-	-	-	9	-	-	-	180			9
Y	85	1	-	-	-	-	-	-	-	-	1	-	-	-	66			1
	91	1	-	-	-	-	-	-	-	-	1	-	-	-	66			1
	98	6	-	-	2	-	-	-	-	-	8	-	-	-	160			8
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	98	1	-	-	1	-	-	-	2	-	4	-	-	-	80	-	-	4

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	00%	00%	00%	+ 0%
'91	00%	00%	00%	+73%
'98	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'85	66	Dec:	-
	'91	66		-
	'98	240		-

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Opuntia spp.																		
S	85	1	-	-	-	-	-	-	-	-	1	-	-	-	66			1
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Y	85	1	-	-	-	-	-	-	-	-	1	-	-	-	66			1
	91	2	-	-	1	-	-	-	-	-	3	-	-	-	200			3
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	91	4	-	-	-	-	-	-	-	-	4	-	-	-	266	5	6	4
	98	3	-	-	1	-	-	-	-	-	4	-	-	-	80	5	10	4

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	00%	00%	00%	+86%
'91	00%	00%	00%	-83%
'98	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'85	66	Dec:	-
	'91	466		-
	'98	80		-

Pinus edulis

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Y	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	1	-	-	1	-	-	-	-	-	2	-	-	-	40			2

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	00%	00%	00%	
'91	00%	00%	00%	
'98	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'85	0	Dec:	-
	'91	0		-
	'98	40		-

Sclerocactus

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	98	1	-	-	-	-	-	-	-	-	1	-	-	-	20	2	4	1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	00%	00%	00%	
'91	00%	00%	00%	
'98	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'85	0	Dec:	-
	'91	0		-
	'98	20		-

Trend Study 22-6-98

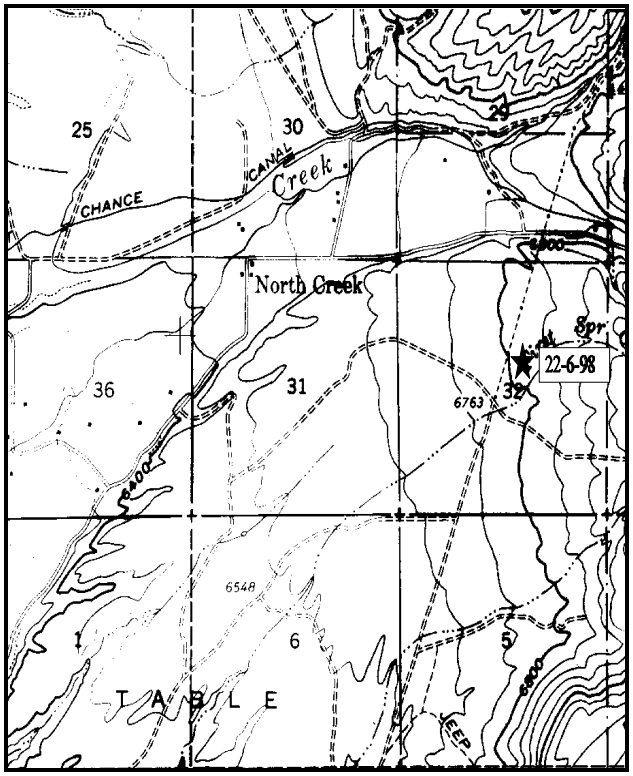
Study site name: Beaver Table . Range type: Cabled, Reseeded P-J .

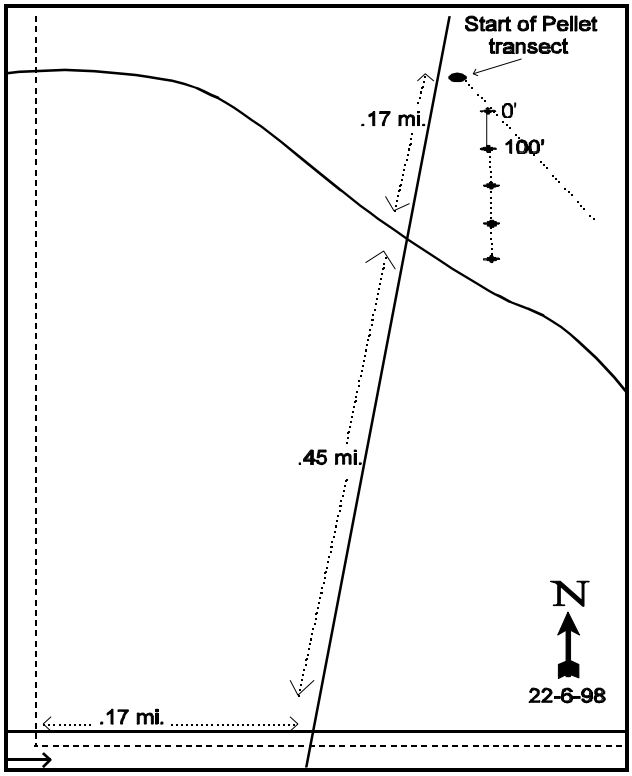
Compass bearing: frequency baseline 180 degrees.

Footmark (first frame placement) 5 feet. Frequency belt placement; line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

LOCATION DESCRIPTION

From the corner of North Creek Road and SR153 in Beaver, go north 1.95 miles to a gravel pit on the right. On the south side of the gravel pit a good dirt road goes northeast up the bottom of a draw. Drive up this road 0.75 miles to a fork, go straight (right fork goes to Bone Hollow transect). Continue 0.8 miles to a fork, turn right through the fence. Go 0.5 miles to another fork, go straight heading north then east 0.5 miles to a fence. Continue east past the fence 0.25 miles to another fence line with a fork just beyond it. Go straight (east) another 0.25 miles to a junction with a road going north-south, turn left (north). Go 0.45 miles to a junction with a road going east-west. Continue north 0.15 miles to a fencepost 15 feet off the road to the right. This fencepost marks the start of a pellet group transect which runs 158 degrees from the post with a short yellow stake every 25 feet. Count down 3 short stakes to locate the 0-foot baseline stake, a 3-foot rebar tagged #7049.





Map Name: Beaver, Utah Diagrammatic Sketch

Township 28S , Range 6W , Section 32 UTM 4243683.833 N, 364221.951 E

DISCUSSION

Trend Study No. 22-6 (56A-2)

The Beaver Table trend study is located on a bench at the foot of the Tushar Mountains northeast of Beaver. The Beaver bench area is recognized as critical range to wintering deer, especially since completion of I-15 has restricted movement to the extensive winter ranges west of I-15. The study is in the center of a Division of Wildlife Resources owned section, which was cabled and seeded in 1957. The general terrain is a long gentle slope (3-5%) with a western aspect and an elevation of 6,800 feet. The vegetative community is dominated by Wyoming big sagebrush and scattered bitterbrush and juniper.

No cattle grazing is authorized in the area. With an average of 40 deer days use/acre between 1981 and 1985, the pellet group transect on the site recorded the second highest 5-year average for annual use on this herd unit at the time (Jense et al. 1985). Since then, through the winter of 1990-91, the average was even higher at 56 deer days use/acre (Jense et al. 1991). Between 1993 and 1997, deer days use/acre averaged 18 (Evans et al. 1997). A pellet group transect read on the site in 1998 indicates 47 deer days use/acre.

The soil is alluvially deposited with an average effective rooting depth (see methods) of 17 inches. Soil textural analysis indicates a clay soil with a neutral pH (6.6). There is a lime cemented hardpan approximately two feet below the surface, which could limit rooting depth. A number of large rocks from basaltic parent material are found throughout the soil profile. There is also a concentration of rocks and pavement on and near the soil surface. Good litter and vegetative cover and the gentle slope moderates the hazard of severe soil erosion, which occurs only to a small degree on the site. Some overland water movement is apparent near the end of the transect.

The dominant species is Wyoming big sagebrush. This population is currently a mixture of mature (51%) and decadent (48%) plants. Percent decadency is similar to that reported in 1991, but the percentage of decadent plants classified as dying has increased to 25%. Intensity of utilization is consistent over all years with most plants showing light to moderate use. With an exception in 1985 for young plants, seedling and young plants have rarely been encountered. Plants displaying poor vigor has remained relatively consistent and is currently at 13% of the population. The relatively large decrease in sagebrush density from 1991 and 1998 can be partially explained by number of dead plants in the population, however the majority of the change is because of a much larger sample size giving more accurate estimates for browse populations with clumped and/or discontinuous distributions. Antelope bitterbrush, an important species, provides only 4% cover on the site. It is a highly preferred species by deer and has been moderately to heavily hedged in the past. Currently, hedging is moderate and the plants average 27 inches in height. Past intense grazing does not seem to have adversely effected the plants vigor, as they are spreading out over the ground and also producing good numbers of young.

Young Utah junipers are scattered over the area and show signs of reinvasion in the upper end of the treated section. Point-centered quarter data from 1998 estimate 107 Utah juniper trees/acre. Broom snakeweed, an undesirable browse species, shows high fluctuations in density between all years. Current density is estimated to be 7,640 plants/acre with 69% of the population classified as mature and 31% as young. This high fluctuation in density is typical for areas that have experienced the extended drought followed by years with normal precipitation patterns.

The dominate grass is cheatgrass which accounts for 56% of the herbaceous understory cover and 27% of the total vegetative cover. Cheatgrass was found in 99 out of 100 quadrats and had a nested frequency of 345 out of a possible 400. Bottlebrush squirreltail, Indian ricegrass, muttongrass, and bluebunch wheatgrass occur rather sporadically, but enough to provide some forage. Indian ricegrass and bluebunch wheatgrass have significantly increased in nested frequency, while bottlebrush squirreltail has significantly decreased in nested frequency since 1991. The grasses are vigorous and currently not utilized. Perennial herbaceous understory sum of nested frequency has declined slightly over all years from 238 in 1985 to 199 in 1998.

A variety of herbaceous vegetation besides the grasses is present. Seventeen species of forbs were encountered, a few of which are large enough and common enough to be a valuable forage source. These include lobeleaf groundsel, longleaf phlox, and sulfur eriogonum. No seeded species were found.

1985 APPARENT TREND ASSESSMENT

An increase in the frequency of herbaceous vegetation and litter cover indicates an improving soil condition and the slowing of soil erosion and adding organic matter. With the apparent increase in grasses and forbs, vegetative trend is also upward for the time being. However, snakeweed and juniper appear to be slowly increasing in this area. Since deer use appears to be increasing, the added pressure on the more palatable species may favor these invaders and accelerate their invasion into the community. Chaining and seeding projects similar to this one could be done in adjacent areas and alleviate some of the browsing pressure to maintain the range in good condition for a longer period.

1991 TREND ASSESSMENT

Soil trend is slightly down because vegetative basal cover is down, as well as litter, with percent bare ground increasing to 32%. Browse trend is slightly downward. Wyoming big sagebrush density is increasing, but percent decadency has also increased. Broom snakeweed decreased by 84%. Antelope bitterbrush density has also increased by 32% with a good percent of young plants present. The sum of nested frequency values indicates a stable herbaceous understory trend.

TREND ASSESSMENT
soil - slightly downward
browse - slightly downward with an increase in percent decadency for Wyoming big sagebrush
herbaceous understory - stable

1998 TREND ASSESSMENT

The soil trend is slightly upward. Percent bare ground cover has declined while percent litter cover has increased. Some erosion is apparent near the end of the transect, but this is not accelerated and more of the soil is becoming protected from erosion. Much of the litter is fine fuels, provided chiefly from the cheatgrass, and could carry a fire throughout the site. The browse trend is downward. Wyoming big sagebrush percent decadency is still high with 48% of the population classified as decadent. A disturbing element of the Wyoming big sagebrush population is the increase in the percentage of decadent plants classified as dying. If this trend continues much of the population could be lost. The herbaceous understory is slightly downward. Perennial grass, the important component of the herbaceous understory on this site, shows a consistent decline in sum of nested frequency over all years.

TREND ASSESSMENT
soil - slightly upward
browse - slightly downward
herbaceous understory - slightly downward

HERBACEOUS TRENDS --
Herd unit 22 , Study no: 6

Type	Species	Nested Frequency '85	'91	'98	Quadrat Frequency '85	'91	'98	Average Cover % '98
G	Agropyron cristatum	-	-	1	-	-	1	.00
G	Agropyron spicatum	a-	a-	b14	-	-	8	.44
G	Bromus japonicus (a)	-	-	4	-	-	1	.03
G	Bromus tectorum (a)	-	-	345	-	-	99	11.17
G	Oryzopsis hymenoides	a35	a24	b50	14	12	26	2.58
G	Poa fendleriana	20	17	19	8	10	8	.71
G	Poa pratensis	-	-	1	-	-	1	.03
G	Sitanion hystrix	b182	b180	a114	71	77	53	3.65
G	Stipa lettermani	1	3	-	1	1	-	-
Total for Annual Grasses		0	0	349	0	0	100	11.20
Total for Perennial Grasses		238	224	199	94	100	97	7.42
Total for Grasses		238	224	548	94	100	197	18.62
F	Agoseris glauca	-	-	7	-	-	3	.01
F	Alyssum alyssoides (a)	-	-	5	-	-	2	.01
F	Antennaria rosea	a-	a-	b6	-	-	4	.04
F	Arabis demissa	ab15	b27	a6	8	16	2	.01
F	Astragalus convallarius	ab3	a-	b8	1	-	5	.15
F	Astragalus spp.	-	-	4	-	-	2	.03
F	Castilleja chromosa	-	6	-	-	3	-	-
F	Calochortus nuttallii	2	-	-	1	-	-	-
F	Castilleja spp.	-	-	-	-	-	-	.00
F	Chaenactis douglasii	b35	b33	a6	17	19	2	.04
F	Cymopterus spp.	4	-	-	2	-	-	-
F	Epilobium paniculatum (a)	-	-	31	-	-	13	.09
F	Eriogonum umbellatum	3	2	6	2	1	3	.06
F	Lactuca serriola	-	-	2	-	-	1	.00
F	Lotus utahensis	-	-	1	-	-	1	.00
F	Machaeranthera canescens	ab3	a-	b10	1	-	5	.17
F	Penstemon spp.	-	-	1	-	-	1	.03
F	Phlox longifolia	a17	b42	ab41	6	22	16	.15
F	Polygonum douglasii (a)	-	-	9	-	-	4	.02
F	Senecio multilobatus	b24	a7	ab12	12	5	8	.07
F	Sphaeralcea coccinea	29	24	22	11	9	10	.30
Total for Annual Forbs		0	0	45	0	0	19	0.12
Total for Perennial Forbs		135	141	132	61	75	63	1.10
Total for Forbs		135	141	177	61	75	82	1.22

Values with different subscript letters are significantly different at % = 0.10 (annuals excluded)

BROWSE TRENDS --
Herd unit 22 , Study no: 6

Type	Species	Strip Frequency '98	Average Cover % '98
B	Artemisia tridentata wyomingensis	90	13.81
B	Gutierrezia sarothrae	61	4.11
B	Juniperus osteosperma	3	.78
B	Opuntia spp.	0	-
B	Pinus edulis	1	-
B	Purshia tridentata	30	3.14
B	Ribes cereum cereum	1	-
Total for Browse		186	21.86

CANOPY COVER --
Herd unit 22 , Study no: 6

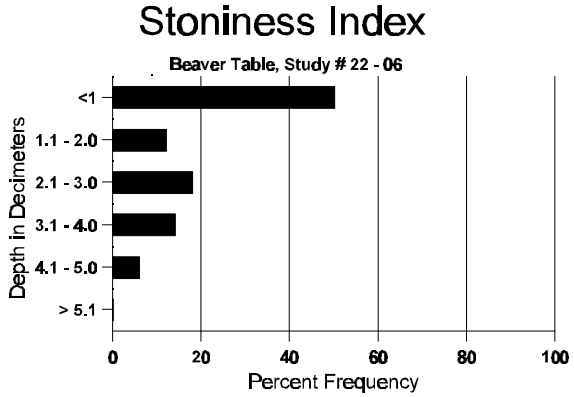
Species	Percent Cover '98
Juniperus osteosperma	.60

BASIC COVER --
Herd unit 22 , Study no: 6

Cover Type	Nested Frequency '98	Average Cover % '85	'91	'98
Vegetation	360	6.50	5.25	41.77
Rock	209	14.50	10.25	9.70
Pavement	247	11.50	12.25	11.98
Litter	391	40.75	39.25	47.04
Cryptogams	9	.25	.75	.02
Bare Ground	253	26.50	32.25	18.15

SOIL ANALYSIS DATA --
Herd Unit 22, Study # 06, Study Name: Beaver Table

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%0M	PPM P	PPM K	dS/m
17.1	62.4 (16.5)	6.6	36.7	22.7	40.6	2.2	10.6	73.6	.6



PELLET GROUP FREQUENCY --
Herd unit 22 , Study no: 6

Type	Quadrat Frequency '98
Rabbit	39
Deer	43

BROWSE CHARACTERISTICS --
Herd unit 22 , Study no: 6

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Artemisia tridentata wyomingensis																		
S	85	3	1	-	-	-	-	-	-	-	4	-	-	-	266			4
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
Y	85	22	9	1	-	-	-	-	-	-	23	4	5	-	2133			32
	91	-	3	-	3	-	-	-	-	-	6	-	-	-	400			6
	98	5	-	-	-	-	-	-	-	-	5	-	-	-	100			5
M	85	31	29	-	-	-	-	-	-	-	57	-	3	-	4000	15	20	60
	91	24	18	10	2	6	3	1	-	-	55	5	2	2	4266	17	26	64
	98	59	66	8	1	3	-	-	-	-	136	1	-	-	2740	19	26	137
D	85	9	23	1	-	-	-	-	-	-	25	2	5	1	2200			33
	91	30	17	11	9	6	4	3	-	-	57	3	10	10	5333			80
	98	68	47	13	-	1	-	-	-	-	94	1	2	32	2580			129
X	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	1	-	-	-	-	-	-	-	-	1	-	-	-	1380			69

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	49%	02%	11%	+17%
'91	33%	19%	16%	-46%
'98	43%	08%	13%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'85	8333	Dec:	26%
	'91	9999		53%
	'98	5420		48%

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Gutierrezia sarothrae																		
S	85	35	-	-	-	-	-	-	-	-	34	1	-	-	2333			35
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	18	-	-	-	-	-	-	-	-	18	-	-	-	360			18
Y	85	42	-	-	-	-	-	-	-	-	42	-	-	-	2800			42
	91	1	-	-	-	-	-	-	-	-	1	-	-	-	66			1
	98	119	-	-	1	-	-	-	-	-	120	-	-	-	2400			120
M	85	67	-	-	-	-	-	-	-	-	67	-	-	-	4466	9	8	67
	91	8	-	-	2	-	-	1	-	-	11	-	-	-	733	9	6	11
	98	259	-	-	3	-	-	-	-	-	262	-	-	-	5240	13	11	262
D	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	4	-	-	1	-	-	-	-	-	4	-	-	1	333			5
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	00%	00%	00%	-84%
'91	00%	00%	06%	+85%
'98	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
'85	7266	Dec:		0%
'91	1132			29%
'98	7640			0%

Juniperus osteosperma																		
S	85	3	-	-	-	-	-	-	-	-	3	-	-	-	200			3
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	-	-	-	1	-	-	-	-	-	1	-	-	-	20			1
Y	85	1	-	-	-	-	-	-	-	-	1	-	-	-	66			1
	91	1	-	-	-	-	-	-	-	-	1	-	-	-	66			1
	98	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
M	85	2	-	-	-	-	-	-	-	-	2	-	-	-	133	69	45	2
	91	2	-	-	-	-	-	-	-	-	2	-	-	-	133	78	68	2
	98	2	-	-	-	-	-	-	-	-	2	-	-	-	40	-	-	2

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	00%	00%	00%	+ 0%
'91	00%	00%	00%	-70%
'98	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)			
'85	199	Dec:	-
'91	199		-
'98	60		-

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Opuntia spp.																		
Y	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	3	1	1	-	-	-	-	-	-	4	-	1	-	333			5
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	85	2	-	-	-	-	-	-	-	-	2	-	-	-	133	5	12	2
	91	1	-	-	-	-	-	-	-	-	-	-	1	-	66	4	6	1
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	0	7	19	0
D	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	1	-	-	-	-	-	1	66			1
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	00%	00%	00%	+71%
'91	14%	14%	43%	
'98	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
'85	133	Dec:		0%
'91	465			14%
'98	0			0%

Pinus edulis																		
S	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
Y	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	00%	00%	00%	
'91	00%	00%	00%	
'98	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)			
'85	0	Dec:	-
'91	0		-
'98	20		-

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Purshia tridentata																		
S	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	1	-	-	-	-	-	1	-	-	2	-	-	-	40			2
Y	85	-	2	-	-	-	-	-	-	-	2	-	-	-	133			2
	91	2	7	2	-	1	-	1	-	-	13	-	-	-	866			13
	98	12	-	-	3	-	-	-	-	-	15	-	-	-	300			15
M	85	-	3	8	-	-	-	-	-	-	11	-	-	-	733	22	11	11
	91	-	-	1	-	-	1	-	-	-	2	-	-	-	133	33	53	2
	98	3	14	7	-	-	-	-	-	-	24	-	-	-	480	27	46	24
D	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	1	1	-	2	-	-	-	-	2	-	2	-	266			4
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	38%	62%	00%	+32%
'91	58%	26%	11%	-38%
'98	36%	18%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
'85	866	Dec:		0%
'91	1265			21%
'98	780			0%

Ribes cereum cereum																		
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	98	5	-	-	-	-	-	-	-	-	5	-	-	-	100	12	16	5

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	00%	00%	00%	
'91	00%	00%	00%	
'98	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)			
'85	0	Dec:	-
'91	0		-
'98	100		-

Trend Study 22-7-98

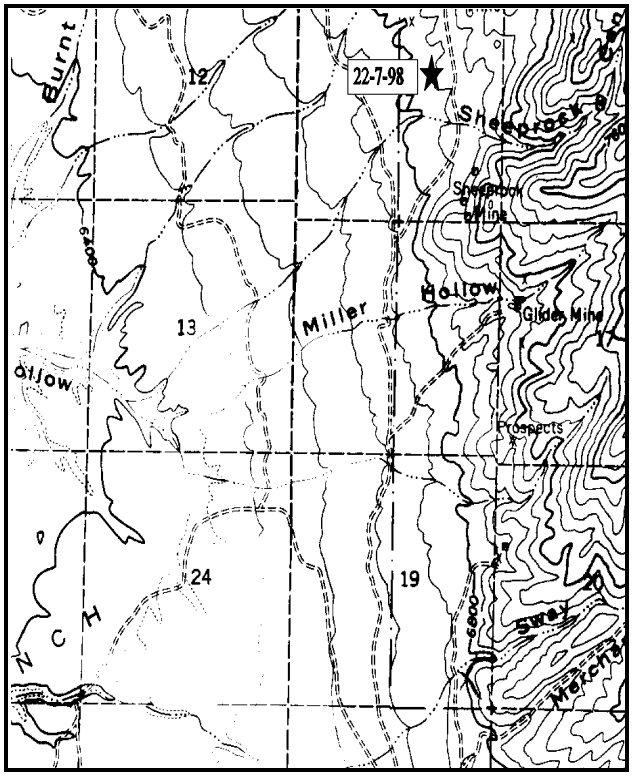
Study site name: Sheep Rock . Range type: Chained, Cabled, Seeded P-J .

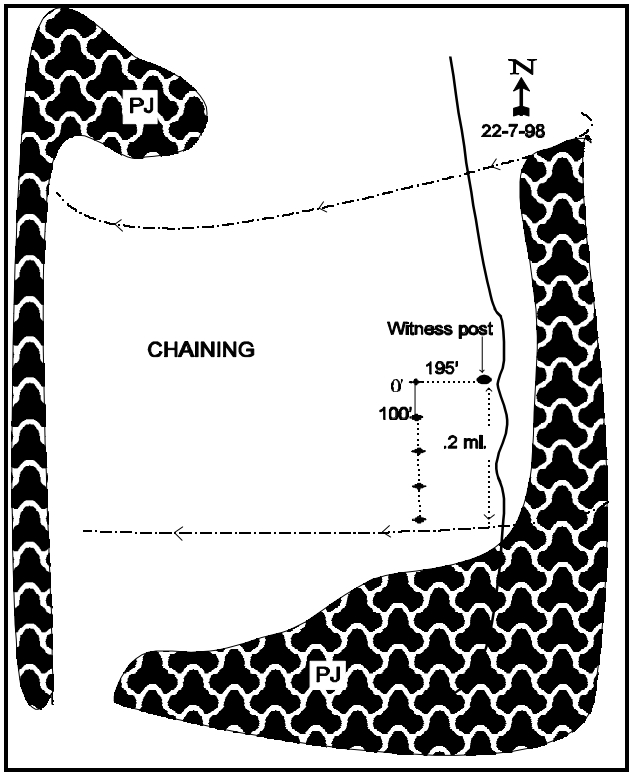
Compass bearing: frequency baseline 180 degrees.

Footmark (first frame placement) 5 feet. Frequency belt placement; line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

LOCATION DESCRIPTION

From the junction of SR153 and North Creek Road east of Beaver, proceed north on the North Creek Road 5.0 miles to a fork. Keep to the right on the pavement and continue 0.5 miles to another fork. Turn left and drive 0.55 miles, crossing a bridge, to a fork in the road with a sheeprock sign. Turn left and after 100 yards take a sharp bend to the left to stay on the good road. Drive about 200 yards and keep to the right at another fork. Continue 0.175 miles and again keep right at a fork. Go 1.625 miles to a cattle guard and 0.15 miles beyond it to a fork. Turn to the left instead of crossing a cattle guard into a chained area. Drive 0.9 miles further to cross a cattleguard and enter the chained area. Go 0.35 miles to a fork, stay left. After 0.25 miles you will again enter directly into the chained area. Continue 0.2 miles into the chaining to a witness post on the left side of the road. The frequency baseline starts 195 feet west of the witness post. The 0-foot baseline stake is a short rebar with a browse tag #7058 attached.





Map Name: Beaver, Utah Diagrammatic Sketch

Township 28S , Range 6W , Section 7 UTM 4249989.529 N, 362980.603 E

DISCUSSION

Trend Study No. 22-7 (56A-3)

The Sheep Rock trend study is located near the mouth of Sheep Rock Canyon on the gentle (5-10%) west sloping foothills of the Tushar Mountains. Elevation is 6,800 feet. The study samples a Forest Service chaining and seeding project completed in the fall of 1981. The Forest Service two-way chaining effectively removed the pinyon-juniper overstory and the site is currently dominated by seeded perennial grasses. Fire has also apparently been an influence as the site burned after the chaining. The fire consumed many of the downed pinyon-juniper snags and continued up the mountain into the untreated woodland. The lack of adequate browse species is the most notable effect of the past wildfire. One-quarter mile to the west is the BLM boundary and a 25-year old chaining.

In some winters, deer spend much of the season at lower elevations. Judging from data collected at the Sheep Rock deer pellet group transect, use is generally low. With its abundance of valuable early season grasses, the area makes an excellent early spring range for mule deer and winter range for elk. There was an increase in use in the winter of 1984-85 (Jense et al. 1985). Since then, the deer days use/acre has risen to 11 (Jense et al. 1991). It appears that the pellet group transect has not been read since that time. A pellet group transect read on the site in 1998 indicates 12 deer days use/acre and 52 cow days use/acre.

Soil textural analysis indicates a sandy loam with a slightly acidic pH (6.5). The average effective rooting depth (see methods) is just over 11 inches with an average soil temperature of 47°F at a depth of 15 inches. The grasses provide a high percentage of ground cover (85%) with all the seeded species considered valuable for watershed protection. There was only a small amount of bare soil (9%) in 1985, which has increased to 26% in 1991, and has now dropped to 7% in 1998. There is no evidence of conspicuous soil erosion.

Large shrubs are currently lacking on the site. Few young or seedling plants of big sagebrush, antelope bitterbrush, true mountain mahogany, and Gambel oak are found in the area. Some pinyon and Utah juniper trees are present, but they are quite scattered. Point-centered quarter data from 1998 estimate 15 pinyon and 47 Utah juniper trees/acre.

By far the most abundant and productive class of vegetation is the grasses which provides 85% of the vegetation cover. Cheatgrass is one of the abundant species, but there are many other seeded grasses present which will help keep cheatgrass in check. The most abundant perennial species are smooth brome, crested wheatgrass, and intermediate wheatgrass. Smooth brome sum of nested frequency has shown a significant increase in value every year since 1985. Perennial grass sum of nested frequency has continued to increased from 411 in 1985, to 542 in 1991, and is currently 613.

In 1985, the only forbs identified were two seeded species, alfalfa and small burnet. At that time it was felt that the abundance of the highly preferred alfalfa will be an important indicator of range trend in the future. Alfalfa has not been encountered on the site since 1985. This is probably an illustration of the effects of an extended drought coupled with excessive selective grazing. Many annual forbs are present on the site and they include: pale alyssum, little flower collinsia, annual stickseed, and little polecat. American vetch is by far the most abundant forb and is of moderate to high palatability for wildlife and livestock.

1985 APPARENT TREND ASSESSMENT

The chaining and seeding was successful and trend is upward for herbaceous species. The soil is stable and protected by a variety of grasses. The grasses appear to be increasing in density, but not so much as to compete with the upcoming browse component. Several species of valuable deer browse are present and as they increase, the area will be even better for deer, although it is now excellent elk range.

1991 TREND ASSESSMENT

The trend for soil is down since vegetative basal cover has decreased to only 3% from a high of 11%. Percent bare ground has increased from 9% to 26%. The large increase in percent bare ground and decreases in vegetational basal cover, pavement, and rock would indicate possible movement of soils across the soil surface. The browse trend is basically non-existent because of the chaining-seeding and wildfire going through the area after treatment. The grasses of the herbaceous understory have a higher nested frequency value, but forbs are very scarce. Even with a slight decrease for forbs, they are still so scarce they are of little use on this site. Trend for herbaceous understory is up.

TREND ASSESSMENT
soil - down
browse - none available since the treatment and fire
herbaceous understory - up for grasses, few forbs on site

1998 TREND ASSESSMENT

The soil trend is upward. There is abundant vegetation and litter cover to protect from erosion at this time. Additionally, percent bare ground has decreased from 26% in 1991 to 7% in 1998. The browse trend is basically non-existent because of the chaining-seeding and wildfire going through the area after treatment. Photographs show that the pinyon and Utah juniper trees are increasing in size over time. The herbaceous understory trend is upward. Perennial herbaceous understory sum of nested frequency has increased from 546 in 1991 to 749 in 1998. Although cheatgrass is present on the site, it will remain under control with the very competitive perennial species on the site.

TREND ASSESSMENT
soil - upward
browse - none available since the treatment and fire
herbaceous understory - upward with an increase in perennial herbaceous understory sum of nested frequency

HERBACEOUS TRENDS --
Herd unit 22 , Study no: 7

Type	Species	Nested Frequency '85	'91	'98	Quadrat Frequency '85	'91	'98	Average Cover % '98
G	Agropyron cristatum	a89	b136	b170	44	59	63	8.96
G	Agropyron intermedium	b173	b240	a174	78	98	53	9.92
G	Agropyron spicatum	-	-	2	-	-	1	.03
G	Bromus inermis	a95	b135	c219	41	54	75	9.84
G	Bromus tectorum (a)	-	-	298	-	-	87	11.51
G	Elymus junceus	b29	ab11	a4	14	6	3	.33
G	Poa secunda	a3	a2	b40	1	2	14	.91
G	Sitanion hystrix	b22	b18	a4	12	12	2	.01
Total for Annual Grasses		0	0	298	0	0	87	11.51
Total for Perennial Grasses		411	542	613	190	231	211	30.01
Total for Grasses		411	542	911	190	231	298	41.53

Type	Species	Nested Frequency '85	'91	'98	Quadrat Frequency '85	'91	'98	Average Cover % '98
F	Agoseris glauca	-	-	4	-	-	2	.01
F	Alyssum alyssoides (a)	-	-	63	-	-	22	.16
F	Arabis spp.	-	3	5	-	2	2	.01
F	Astragalus convallarius	-	-	1	-	-	1	.03
F	Astragalus spp.	-	-	2	-	-	1	.00
F	Camelina microcarpa (a)	-	-	17	-	-	7	.03
F	Calochortus nuttallii	-	-	2	-	-	1	.00
F	Chaenactis douglasii	-	-	1	-	-	1	.00
F	Collinsia parviflora (a)	-	-	56	-	-	23	.11
F	Crepis acuminata	-	-	1	-	-	1	.03
F	Cymopterus spp.	-	-	1	-	-	1	.00
F	Draba spp. (a)	-	-	12	-	-	4	.02
F	Eriogonum racemosum	-	-	3	-	-	1	.03
F	Holosteum umbellatum (a)	-	-	3	-	-	2	.01
F	Lappula occidentalis (a)	-	-	32	-	-	15	.10
F	Leucelene ericoides	-	-	5	-	-	2	.15
F	Medicago sativa (ladak)	$_{b}$35	$_{a}$-	$_{a}$-	15	-	-	-
F	Microsteris gracilis (a)	-	-	20	-	-	7	.16
F	Orobanche fasciculata	-	-	2	-	-	1	.00
F	Phacelia spp.	-	1	-	-	1	-	-
F	Phlox longifolia	-	-	2	-	-	2	.01
F	Polygonum douglasii (a)	-	-	5	-	-	2	.01
F	Ranunculus testiculatus (a)	-	-	5	-	-	3	.06
F	Sanguisorba minor	1	-	-	1	-	-	-
F	Tragopogon dubius	-	-	2	-	-	1	.00
F	Unknown forb-perennial	$_{b}$20	$_{a}$-	$_{a}$-	8	-	-	-
F	Vicia americana	$_{a}$-	$_{a}$-	$_{b}$105	-	-	43	2.28
Total for Annual Forbs		0	0	213	0	0	85	0.67
Total for Perennial Forbs		56	4	136	24	3	60	2.59
Total for Forbs		56	4	349	24	3	145	3.26

Values with different subscript letters are significantly different at % = 0.10 (annuals excluded)

BROWSE TRENDS --
Herd unit 22 , Study no: 7

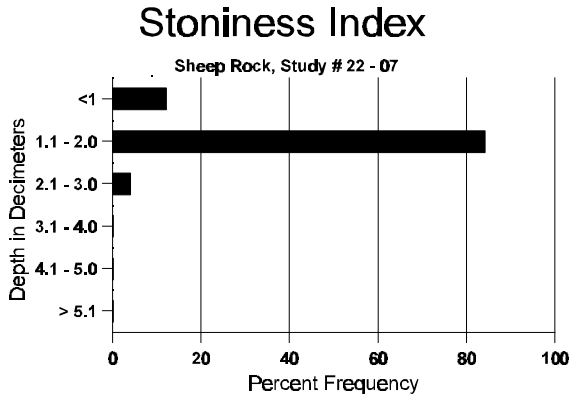
Type	Species	Strip Frequency '98	Average Cover % '98
B	Amelanchier utahensis	0	-
B	Artemisia tridentata vaseyana	1	.63
B	Cercocarpus montanus	0	-
B	Chrysothamnus nauseosus	0	-
B	Chrysothamnus viscidiflorus	0	-
B	Gutierrezia sarothrae	0	-
B	Juniperus osteosperma	2	1.79
B	Pinus edulis	0	-
B	Purshia tridentata	0	-
B	Quercus gambelii	4	1.79
Total for Browse		7	4.21

BASIC COVER --
Herd unit 22 , Study no: 7

Cover Type	Nested Frequency '98	Average Cover % '85	'91	'98
Vegetation	384	10.50	3.00	48.07
Rock	86	1.50	2.50	3.09
Pavement	285	28.75	16.25	21.02
Litter	396	50.25	52.25	50.47
Cryptogams	10	0	0	.05
Bare Ground	196	9.00	26.00	7.12

SOIL ANALYSIS DATA --
Herd Unit 22, Study # 07, Study Name: Sheep Rock

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%0M	PPM P	PPM K	dS/m
11.2	47.0 (15.1)	6.5	54.0	28.4	17.6	3.0	10.0	172.8	.9



PELLET GROUP FREQUENCY --
Herd unit 22 , Study no: 7

Type	Quadrat Frequency '98
Rabbit	6
Elk	1
Deer	4
Cattle	28

BROWSE CHARACTERISTICS --
Herd unit 22 , Study no: 7

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Amelanchier utahensis																		
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	0	35	19	0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	00%	00%	00%	
'91	00%	00%	00%	
'98	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)			Dec:
'85	0		-
'91	0		-
'98	0		-

Artemisia tridentata vaseyana																		
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	98	1	-	-	-	-	-	-	-	-	1	-	-	-	20	27	38	1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	00%	00%	00%	
'91	00%	00%	00%	
'98	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)			Dec:
'85	0		-
'91	0		-
'98	20		-

Cercocarpus montanus																		
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	0	27	30	0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	00%	00%	00%	
'91	00%	00%	00%	
'98	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)			Dec:
'85	0		-
'91	0		-
'98	0		-

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Chrysothamnus nauseosus																		
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	0	35	66	0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor
'85	00%	00%	00%
'91	00%	00%	00%
'98	00%	00%	00%

%Change

Total Plants/Acre (excluding Dead & Seedlings)				
	'85	0	Dec:	-
	'91	0		-
	'98	0		-

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Chrysothamnus viscidiflorus																		
Y	85	2	-	-	-	-	-	-	-	-	2	-	-	-	133			2
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	85	11	-	-	-	-	-	-	-	-	11	-	-	-	733	13	11	11
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor
'85	00%	00%	00%
'91	00%	00%	00%
'98	00%	00%	00%

%Change

Total Plants/Acre (excluding Dead & Seedlings)				
	'85	866	Dec:	-
	'91	0		-
	'98	0		-

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Gutierrezia sarothrae																		
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	91	4	-	-	-	-	-	-	-	-	4	-	-	-	266	10	11	4
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	0	12	12	0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor
'85	00%	00%	00%
'91	00%	00%	00%
'98	00%	00%	00%

%Change

Total Plants/Acre (excluding Dead & Seedlings)				
	'85	0	Dec:	-
	'91	266		-
	'98	0		-

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Juniperus osteosperma																		
S	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	1	-	-	-	-	-	-	-	-	1	-	-	-	66			1
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Y	85	1	-	-	-	-	-	-	-	-	1	-	-	-	66			1
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	91	1	-	-	-	-	-	-	-	-	1	-	-	-	66	38	36	1
	98	1	-	-	-	-	-	1	-	-	2	-	-	-	40	-	-	2
X	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	20			1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	00%	00%	00%	+ 0%
'91	00%	00%	00%	-39%
'98	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'85	66	Dec:	-
	'91	66		-
	'98	40		-

Pinus edulis																		
X	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	40			2

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	00%	00%	00%	
'91	00%	00%	00%	
'98	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'85	0	Dec:	-
	'91	0		-
	'98	0		-

Purshia tridentata																		
Y	85	1	-	-	-	-	-	-	-	-	1	-	-	-	66			1
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
D	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	1	-	-	-	-	-	-	-	-	-	1	66			1
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	00%	00%	00%	+ 0%
'91	00%	100%	100%	
'98	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'85	66	Dec:	0%
	'91	66		100%
	'98	0		0%

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Quercus gambelii																		
Y	85	2	-	-	-	-	-	-	-	-	2	-	-	-	133			2
	91	-	2	-	-	-	-	-	-	-	2	-	-	-	133			2
	98	2	-	-	3	-	-	-	-	-	5	-	-	-	100			5
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	98	13	-	-	-	-	-	-	-	-	13	-	-	-	260	44	30	13
D	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	20			1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	00%	00%	00%	+ 0%
'91	100%	00%	00%	+65%
'98	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
'85	133	Dec:		0%
'91	133			0%
'98	380			5%

Trend Study 22-8-98

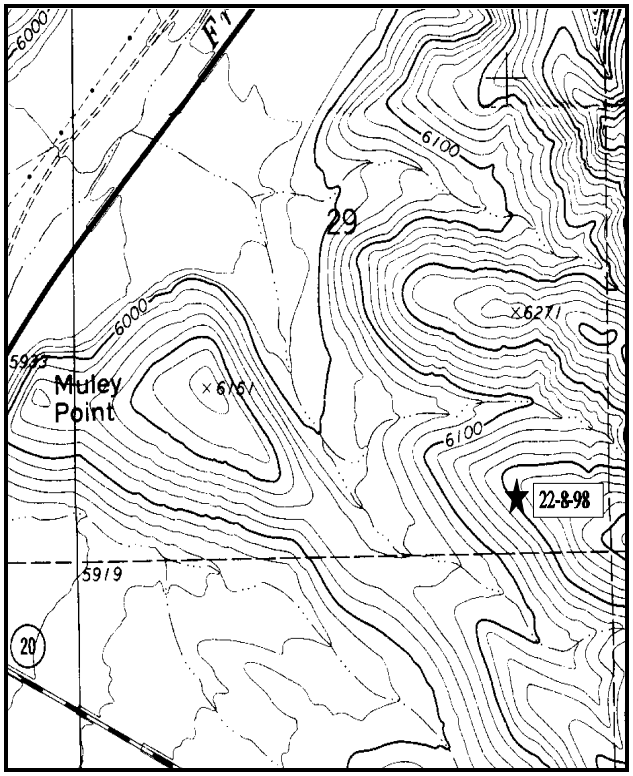
Study site name: Muley Point . Range type: Big Sagebrush .

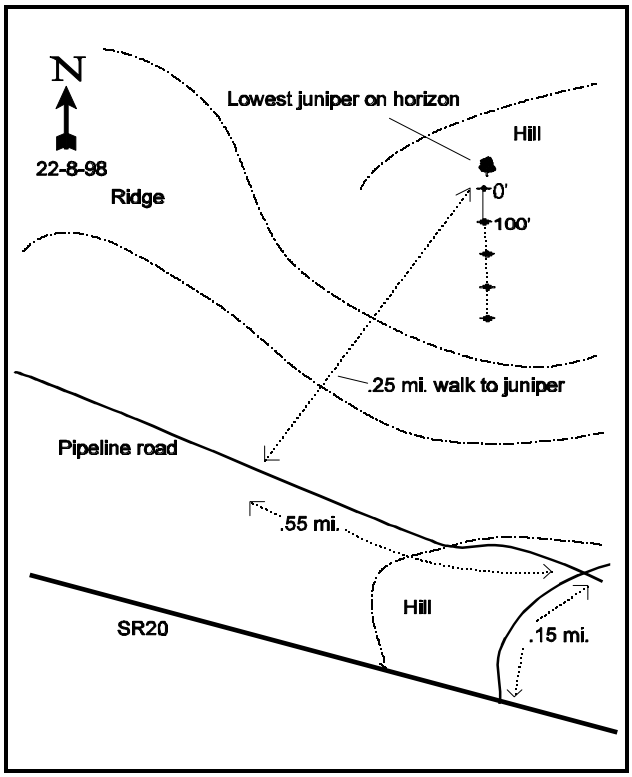
Compass bearing: frequency baseline 180 degrees.

Footmark (first frame placement) 5 feet. Frequency belt placement; line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

LOCATION DESCRIPTION

From exit #95 on I-15 (junction with SR20) go to the east side of the freeway, then go 1.2 miles east from the cattleguard on SR20 to a small wooden H in the fence on the left. Go north, through the gate for 0.15 miles to a 4-way intersection. Turn left on the pipeline road and go 0.55 miles then stop. On the ridge to the north locate the lowest JUOS on the skyline. Walk to the juniper, about 1/4 mile. The base line starts 10 feet south of the JUOS. The 0-foot stake consists of a 3-foot rebar with browse tag #7051 attached.





Map Name: Buckhorn Flat, Utah Diagrammatic Sketch

Township 31S , Range 7W , Section 29 UTM 4215187.646 N, 353663.949 E

DISCUSSION

Trend Study No. 22-8 (56B-1)

The Muley Point trend study is located on a ridge overlooking an expansive sagebrush valley. The study is on BLM administered land at an elevation of 6,200 feet. On the site, and for many miles around, the vegetation is dominated by dense, low growing Wyoming big sagebrush. The site has a moderately steep slope of 25% with a south-southwest aspect. This area lies below the Hurricane Cliffs and is critical deer winter range. The winter range on the adjacent management unit 28 is increasingly threatened by the elimination of sagebrush and conversion to agricultural fields where deer are excluded. This in effect, concentrates deer use on the remainder of the public land on unit 22. Pinyon-juniper density gradually increase to the east as you approach the mountains. Moderately heavy deer use occurs in the winter judging from the pellet group transect data in 1998 with an estimated 80 deer days use/acre on the site.

Soil textural analysis indicates a sandy clay loam with a neutral pH (7.3). The average effective rooting depth (see methods) is 11 inches with an average soil temperature of 62.4°F at 13 inches. Plant development may be limited due to relatively low amounts of phosphorous (5.8 ppm). The soil surface is covered with high amounts of rock (18%) and pavement (34%). Rock and pavement are also present throughout the soil profile. The rocks appear to be from basaltic parent material with some exhibiting calcite deposits. Erosion is minimal with little bare ground cover (12%). There appears to be a hardpan or compacted soil layer about 12 inches below the soil surface which could be limiting to root development.

Although two subspecies of sagebrush, basin big sagebrush and Wyoming big sagebrush, are present, Wyoming big sagebrush is the dominate and the only one to occur in the density strips. These plants average 22 inches in height and continue to display good vigor with moderate hedging. In 1985, 28% of the plants were classified as decadent. This changed dramatically to 75% in 1991. In 1998, percent decadency had declined to 37% of the population. The sagebrush losses noted in 1998 can be partially explained by dead plants in the population (56% of it can be accounted for), the remainder is because of the much larger sample size utilized in 1998. This larger sample size more accurately estimates shrub populations that have discontinuous and/or clumped distributions. Photographs from all years show a thinning of the Wyoming big sagebrush population. Although pinyon and Utah juniper trees are sparse on the study area, they do provide some cover and have all been highlined to about 5 feet.

The herbaceous understory continues to be rather sparse and stunted. Photographs from 1985 and 1991 show no or little cheatgrass was present on the site. In 1998, it is by far the most common grass and provides a dense carpet throughout the shrub interspaces. Most of the other grasses and forbs are found growing under the protection of sagebrush canopies. Perennial grass sum of nested frequency has increased, but only slightly. The most common perennial grasses are bottlebrush squirreltail and Indian ricegrass, which provide a small amount of winter and spring forage. Scarlet globemallow and heath aster significantly increased in nested frequency since 1991. Perennial forb sum of nested frequency has increased since 1991, mostly due to an increase in scarlet globemallow.

1985 APPARENT TREND ASSESSMENT

Now that the surface is covered by a layer of erosion pavement and rock, the soil surface appears basically stable. The indicators also point to a static vegetative trend. Populations appear stable, and the plant composition is not likely to change for a long time unless there is increased browsing pressure from sheep and deer.

1991 TREND ASSESSMENT

The soil trend appears to be stable. However, vegetational basal cover has gone even lower, from 2% to 1%. Percent cover for rock-pavement and litter have changed very little. Percent bare ground has not changed. The key browse species, Wyoming big sagebrush, has decreased by 40%, while the percent decadence has more than doubled to 75%. With the high density of 8,132 plants/acre in 1985, this poor site in conjunction with the extended drought has caused a great deal of thinning within the community. The population should stabilize at a somewhat lower density, but this trend should be monitored closely. Trend for browse is down. The narrative for the herbaceous understory is similar. The sum of nested frequency for both grasses and forbs has dropped substantially since 1985. The only event that can help improve this site is an end this prolonged drought.

TREND ASSESSMENT
soil - stable, but poor condition and poor site potential
browse - downward
herbaceous understory - downward

1998 TREND ASSESSMENT

The soil trend continues to be stable with little erosion apparent. Percent rock and pavement cover has slightly declined over all years, while percent bare ground has stayed relatively similar. The browse trend is downward. Wyoming big sagebrush percent decadency has declined from a high of 75% in 1991 to 37% in 1998, although this is still higher than the 1985 estimate of 28%. The population is slowly declining with low numbers of seedling or young plants encountered in 1998. The dense carpet of cheatgrass in the shrub interspaces provides excessive competition for sagebrush seedling establishment. The herbaceous understory trend is downward. Although perennial herbaceous understory sum of nested frequency has increased, the dense cheatgrass carpet that was not present in the past is a severe fire hazard which could ultimately eliminate the Wyoming big sagebrush population and the value of this area as deer winter range. Perennial grasses and forbs need to increase in abundance to decrease the possibility of a devastating fire.

TREND ASSESSMENT
soil - stable, but poor condition and poor site potential
browse - downward
herbaceous understory - downward

HERBACEOUS TRENDS --
Herd unit 22 , Study no: 8

Type	Species	Nested Frequency '85	'91	'98	Quadrat Frequency '85	'91	'98	Average Cover % '98
G	Aristida purpurea	-	11	26	-	7	11	.32
G	Bromus tectorum (a)	-	-	342	-	-	99	13.36
G	Hilaria jamesii	a-	a-	b8	-	-	4	.19
G	Oryzopsis hymenoides	a44	ab67	b77	21	29	38	2.42
G	Sitanion hystrix	b179	a101	a91	70	47	44	1.56
G	Stipa comata	11	-	4	4	-	2	.04
Total for Annual Grasses		0	0	342	0	0	99	13.36
Total for Perennial Grasses		234	179	206	95	83	99	4.53

Type	Species	Nested Frequency '85	Nested Frequency '91	Nested Frequency '98	Quadrat Frequency '85	Quadrat Frequency '91	Quadrat Frequency '98	Average Cover % '98
Total for Grasses		234	179	548	95	83	198	17.90
F	Astragalus cibarius	18	21	37	9	12	11	5.86
F	Astragalus spp.	-	2	-	-	1	-	-
F	Chaenactis douglasii	$_{b}$21	$_{ab}$15	$_{a}$4	9	6	3	.02
F	Cryptantha spp.	-	3	-	-	3	-	-
F	Descurainia pinnata (a)	-	-	2	-	-	2	.03
F	Eriogonum cernuum (a)	$_{b}$39	$_{a}$10	$_{a}$1	15	5	1	.00
F	Leucelene ericoides	$_{a}$-	$_{a}$-	$_{b}$10	-	-	5	.12
F	Phlox longifolia	-	-	4	-	-	2	.01
F	Sphaeralcea coccinea	$_{a}$4	$_{a}$4	$_{b}$20	2	2	9	.31
F	Unknown forb-perennial	14	-	-	8	-	-	-
Total for Annual Forbs		39	10	3	15	5	3	0.03
Total for Perennial Forbs		57	45	75	28	24	30	6.34
Total for Forbs		96	55	78	43	29	33	6.38

Values with different subscript letters are significantly different at % = 0.10 (annuals excluded)

BROWSE TRENDS --
Herd unit 22 , Study no: 8

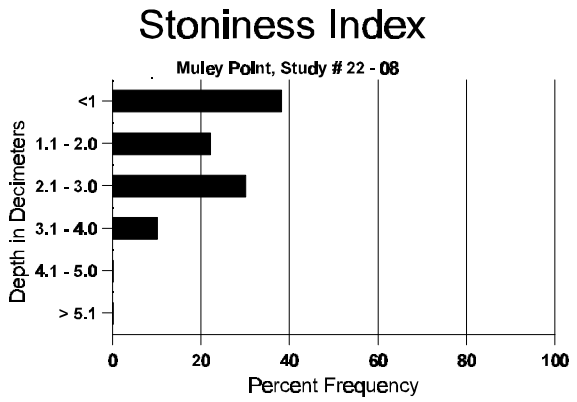
Type	Species	Strip Frequency '98	Average Cover % '98
B	Artemisia tridentata wyomingensis	81	14.77
B	Chrysothamnus viscidiflorus stenophyllus	0	-
B	Opuntia whipplei	1	.00
Total for Browse		82	14.77

BASIC COVER --
Herd unit 22 , Study no: 8

Cover Type	Nested Frequency '98	Average Cover % '85	Average Cover % '91	Average Cover % '98
Vegetation	349	2.00	1.00	33.02
Rock	278	16.25	17.75	17.63
Pavement	354	46.25	42.25	33.62
Litter	378	24.25	28.25	29.89
Cryptogams	6	0	0	.01
Bare Ground	277	11.25	10.75	11.50

SOIL ANALYSIS DATA --
Herd Unit 22, Study # 08, Study Name: Muley Point

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%0M	PPM P	PPM K	dS/m
11.2	62.4 (13.0)	7.3	52.0	27.4	20.6	1.3	5.8	156.8	.6



PELLET GROUP FREQUENCY --
Herd unit 22 , Study no: 8

Type	Quadrat Frequency '98
Rabbit	29
Deer	53

BROWSE CHARACTERISTICS --
Herd unit 22 , Study no: 8

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Artemisia tridentata wyomingensis																		
S	85	2	-	-	-	-	-	-	-	-	2	-	-	-	133			2
	91	5	-	-	-	-	-	-	-	-	5	-	-	-	333			5
	98	2	-	-	-	-	-	-	-	-	2	-	-	-	40			2
Y	85	16	2	-	-	-	-	-	-	-	17	-	1	-	1200			18
	91	1	-	-	-	-	-	-	-	-	1	-	-	-	66			1
	98	17	-	-	2	-	-	-	-	-	19	-	-	-	380			19
M	85	36	34	-	-	-	-	-	-	-	69	-	1	-	4666	17	22	70
	91	3	6	2	3	3	-	-	-	-	16	-	1	-	1133	17	19	17
	98	28	57	1	-	-	-	-	-	-	86	-	-	-	1720	22	28	86
D	85	19	15	-	-	-	-	-	-	-	29	-	5	-	2266			34
	91	6	10	11	15	11	1	1	-	-	45	-	1	9	3666			55
	98	13	47	1	-	-	-	-	-	-	37	-	-	24	1240			62
X	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	860			43

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	42%	00%	06%	-40%
'91	41%	19%	15%	-31%
'98	62%	01%	14%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'85	8132	Dec:	28%
	'91	4865		75%
	'98	3340		37%

Chrysothamnus viscidiflorus stenophyllus																		
M	85	1	-	-	-	-	-	-	-	-	1	-	-	-	66	9	4	1
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	00%	00%	00%	
'91	00%	00%	00%	
'98	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'85	66	Dec:	-
	'91	0		-
	'98	0		-

Opuntia whipplei																		
M	85	3	-	-	-	-	-	-	-	-	3	-	-	-	200	7	7	3
	91	1	-	-	-	-	-	-	-	-	1	-	-	-	66	8	11	1
	98	1	-	-	-	-	-	-	-	-	1	-	-	-	20	7	12	1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	00%	00%	00%	-67%
'91	00%	00%	00%	-70%
'98	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'85	200	Dec:	-
	'91	66		-
	'98	20		-

Trend Study 22-9-98

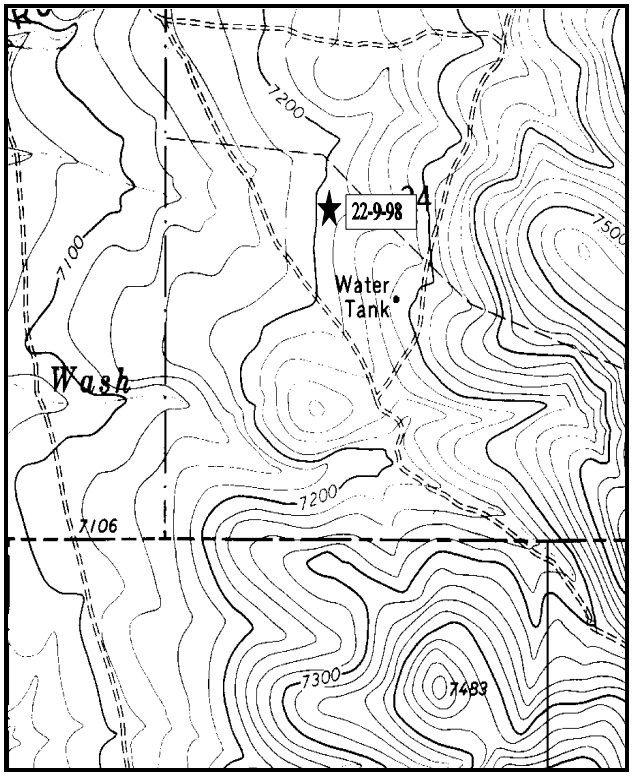
Study site name: Rocks Reseeding . Range type: Chained, Cabled, Reseeded P-J .

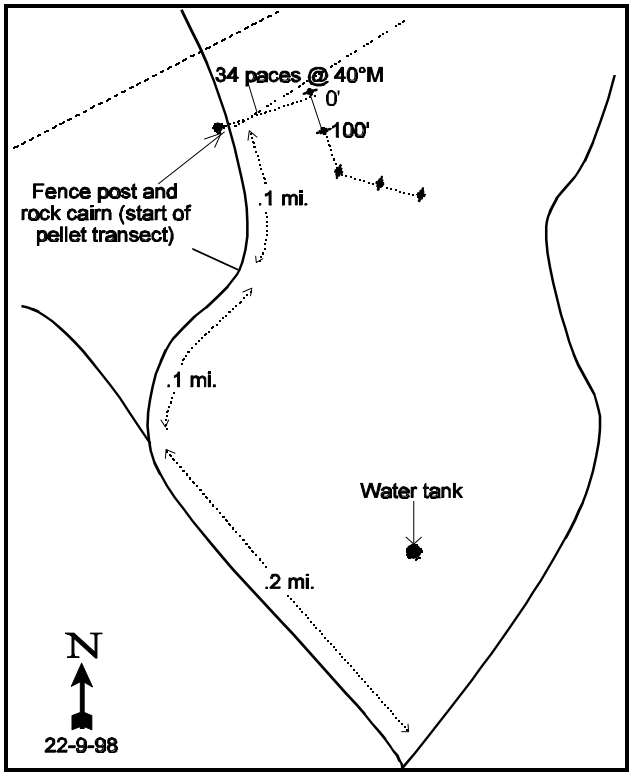
Compass bearing: frequency lines 1-2 163 M degrees. Lines 3-4 116 degrees.

Footmark (first frame placement) 5 feet. Frequency belt placement; line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

LOCATION DESCRIPTION

Begin on I-15 at exit #100, 9 miles south of Beaver. On the east side of the freeway there is a frontage road and a road going straight east. Go east 0.6 miles to an intersection. Turn left and go 3.6 miles to a fork, stay right. Go 2.0 miles to a crossroad then turn left (north) and go 0.2 miles to a cattleguard. Continue 0.65 miles to a fork. Take the middle fork (right) go 1.0 mile and turn left under a stock pond. Go up a steep hill 0.1 miles to a major fork, stay left and go 0.2 miles to another fork. Stay right and go another 0.1 mile to a fork. Keep right and continue 0.1 miles to a pile of rocks painted yellow and a fencepost on the left side of the road. The rocks and fencepost mark the start of a pellet group transect. From the fencepost walk at a bearing of 51 degrees true along the transect. There are small rebar every 30 feet. The baseline starts 10 feet south of the fifth small rebar (150 feet from the fencepost). The frequency baseline is marked by 2-3 foot rebar and the 0-foot stake is tagged #7050. The 200,300 and 400 stakes are half-high fenceposts.





Map Name: Kane Canyon, Utah Diagrammatic Sketch

Township 30S , Range 6W , Section 34 UTM 4224120.643 N, 366399.455 E

DISCUSSION

Trend Study No. 22-9 (56B-2)

The Rocky Reseeding trend study is located on USFS administered land that has basically been developed for livestock grazing. The elevation is 7,200 feet with a westerly aspect and a 4-6% slope. This site was Dixie harrowed in 1962. Large areas were then seeded, mostly with crested wheatgrass. There were also numerous water developments and fencing was completed. A water trough is located about 1/3 of a mile from the site. There is a healthy stand of mountain big sagebrush and antelope bitterbrush with a low density of young Utah juniper scattered throughout the community. Point-centered quarter data indicates 54 juniper trees/acre and 19 pinyon trees/acre in 1998. A pellet group transect read on the site in 1998 indicates light deer use with an estimated 18 deer days use/acre along the pellet group transect. Cattle use also appears light with 20 cow days use/acre. The Circleville Cattle Allotment is on a 3 year rest rotation system. In the first year 360 cattle graze the area from June 1 to July 24. In the second year 360 cattle graze from July 24 through October 15. The pasture is then rested in the third year.

Soil textural analysis indicates a clay loam with a neutral pH (6.6). Average effective rooting depth (see methods) is 13 inches with a soil temperature of 41.6°F measured at a depth of 15 inches. Vegetative development may be limited due to relatively low amounts of phosphorous (9.8 ppm). The soil surface is covered with rocks and pavement that appear to be from basaltic parent material. On the exposed areas the soil is loosely compacted and dusty. Slight erosion is evident, but does not appear excessive.

The overstory is a mixture of mountain big sagebrush and Antelope bitterbrush. Both of these key species are for the most part vigorous, available, abundant, and well utilized. The bitterbrush is the most preferred species and the mature plants have been heavily browsed. Currently, it provides 45% of the browse cover. Some of the bitterbrush plants are getting quite large, up to four feet in height, and were producing abundant flowers in 1998 (indicating improved vigor). This type does not appear to increase by spreading vegetatively (layering). Percent decadency was reported the highest in 1991 at 56%. With increased precipitation and relatively lower use, mostly moderate use (57%), percent decadency has now declined to 10% in 1998. In 1998, mountain big sagebrush density was estimated to be 3,420 plants/acre. Utilization is currently light to moderate and the plants exhibit good vigor. Currently, insect galls are common on most plants and seed heads from the previous year are still attached to the seed stalks. Percent decadency has declined from a high of 33% in 1991 to only 8% in 1998.

Crested wheatgrass is the most abundant grass. It currently provides 93% of the herbaceous cover and 44% of the total vegetative cover, and has significantly increased its nested frequency value since 1991. However, bluebunch wheatgrass, muttongrass, and junegrass have all significantly decreased in nested frequency since 1991. This has caused a decline in sum of nested frequency over all years. Other grasses in low abundance include: galleta, red three-awn, and Indian ricegrass. Utilization of the grasses is heavy over all years.

A variety of forbs were encountered on the site, but none are very abundant, totaling less than 1% cover. The most common is longleaf phlox. Foothill deathcamas, desert Indian paintbrush, and milkvetch all show signs of utilization.

1985 APPARENT TREND ASSESSMENT

There is some soil loss from the site, but protection provided by the vegetative cover helps to curtail erosion. The rest-rotation grazing system should allow the grasses to remain vigorous and productive and also allow some buildup of litter. Grazing pressure on the area by cattle should be closely monitored to insure they do not feed excessively on the bitterbrush during dry years, which is already utilized by deer and is a key species that should remain in the community. Vegetative trend is up until the density of juniper becomes too high.

1991 TREND ASSESSMENT

There has obviously been some soil movement on the site with rock and pavement cover declining from 27% to 19% and percent bare ground more than doubling to 27%. Vegetative basal cover and litter cover have both declined. Trend for soil is down. Trend for browse is confounded, for mountain big sagebrush is increasing while bitterbrush is decreasing. Bitterbrush's biotic potential has decreased along with the percentage of individuals in the young age class. Another critical parameter is that percent decadency for bitterbrush has risen from 9% to 56% and the percentage of plants with heavy use has also risen from 59% to 77%. The biotic potential for sagebrush is still high at 70% and the young age class is also high at 21%. Trend for browse is stable. The trend for herbaceous understory is down for both grasses and forbs even with the rest-rotation grazing system in place. The extended drought has seized control of this grazing program. The forbs have never been very abundant on this site, with many of them having disappeared since the last survey.

TREND ASSESSMENT
soil - downward
browse - stable
herbaceous understory - downward

1998 TREND ASSESSMENT

The soil trend is stable with a slight increase in percent rock and pavement cover and a slight decrease in percent bare ground cover. Erosion is currently negligible. The browse trend is slightly upward with a decrease in percent decadency and an increase in the percentage of plants with good vigor for both key browse species. The bitterbrush population is recovering from high percent decadence in 1991 and appears to be healthy. The herbaceous understory trend is stable with a slight decrease in grass sum of nested frequency and a slight increase in forb sum of nested frequency.

TREND ASSESSMENT
soil - stable
browse - slightly upward
herbaceous understory - stable

HERBACEOUS TRENDS --
Herd unit 22 , Study no: 9

Type	Species	Nested Frequency '85	'91	'98	Quadrat Frequency '85	'91	'98	Average Cover % '98
G	Agropyron cristatum	$_{b}$294	$_{a}$258	$_{b}$301	96	92	96	22.16
G	Agropyron spicatum	$_{b}$77	$_{b}$60	$_{a}$9	35	28	3	.56
G	Aristida purpurea	-	-	2	-	-	1	.03
G	Hilaria jamesii	-	-	3	-	-	1	.03
G	Koeleria cristata	$_{ab}$4	$_{b}$8	$_{a}$-	1	5	-	-
G	Oryzopsis hymenoides	4	-	1	2	-	1	.03
G	Poa fendleriana	$_{c}$51	$_{b}$20	$_{a}$3	23	10	1	.15
Total for Annual Grasses		0	0	0	0	0	0	0
Total for Perennial Grasses		430	346	319	157	135	103	22.96

Type	Species	Nested Frequency '85	'91	'98	Quadrat Frequency '85	'91	'98	Average Cover % '98
Total for Grasses		430	346	319	157	135	103	22.96
F	Agoseris glauca	-	-	1	-	-	1	.03
F	Arabis demissa	$_{b}$8	$_{a}$-	$_{ab}$3	5	-	1	.00
F	Astragalus convallarius	2	-	3	1	-	1	.15
F	Astragalus spp.	$_{ab}$1	$_{a}$-	$_{b}$6	1	-	4	.33
F	Castilleja chromosa	3	-	-	1	-	-	-
F	Chaenactis douglasii	3	-	-	1	-	-	-
F	Collinsia parviflora (a)	-	-	1	-	-	1	.00
F	Cymopterus spp.	-	-	2	-	-	2	.01
F	Delphinium nuttallianum	-	-	5	-	-	3	.04
F	Descurainia pinnata (a)	-	-	2	-	-	1	.00
F	Draba spp. (a)	-	-	2	-	-	1	.00
F	Erigeron spp.	4	-	-	2	-	-	-
F	Eriogonum racemosum	-	-	2	-	-	1	.03
F	Lactuca serriola	-	-	1	-	-	1	.00
F	Lomatium spp.	2	1	4	1	1	3	.01
F	Microsteris gracilis (a)	-	-	9	-	-	5	.02
F	Phlox longifolia	51	37	32	25	20	16	.18
F	Trifolium spp.	3	-	-	1	-	-	-
F	Vicia americana	-	-	3	-	-	2	.03
F	Zigadenus paniculatus	-	-	3	-	-	1	.00
Total for Annual Forbs		0	0	14	0	0	8	0.03
Total for Perennial Forbs		77	38	65	38	21	36	0.84
Total for Forbs		77	38	79	38	21	44	0.88

Values with different subscript letters are significantly different at % = 0.10 (annuals excluded)

BROWSE TRENDS --
Herd unit 22 , Study no: 9

Type	Species	Strip Frequency '98	Average Cover % '98
B	Artemisia tridentata vaseyana	84	14.66
B	Chrysothamnus viscidiflorus stenophyllus	0	-
B	Juniperus osteosperma	5	.15
B	Opuntia whipplei	0	-
B	Pinus edulis	1	-
B	Purshia tridentata	48	12.26
Total for Browse		138	27.07

CANOPY COVER --

Herd unit 22 , Study no: 9

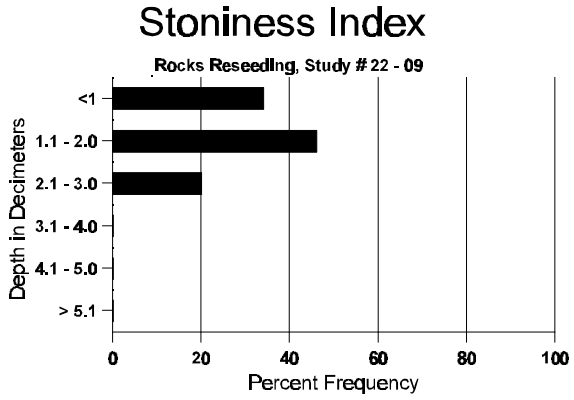
Species	Percent Cover '98
Juniperus osteosperma	.60

BASIC COVER --
Herd unit 22 , Study no: 9

Cover Type	Nested Frequency '98	Average Cover % '85	'91	'98
Vegetation	323	10.25	8.25	39.93
Rock	241	12.50	11.75	11.52
Pavement	239	14.00	6.75	11.13
Litter	377	50.00	45.50	42.81
Cryptogams	18	0	1.00	.45
Bare Ground	241	13.25	26.75	21.22

SOIL ANALYSIS DATA --
Herd Unit 22, Study # 09, Study Name: Rocks Reseeding

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%0M	PPM P	PPM K	dS/m
13.1	41.6 (15.2)	6.6	38	31.4	30.6	2.5	9.8	185.6	.7



PELLET GROUP FREQUENCY --
Herd unit 22 , Study no: 9

Type	Quadrat Frequency '98
Rabbit	23
Elk	2
Deer	21
Cattle	18

BROWSE CHARACTERISTICS --
Herd unit 22 , Study no: 9

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Artemisia tridentata vaseyana																		
S	85	41	-	-	-	-	-	-	-	-	41	-	-	-	2733			41
	91	23	-	-	-	-	-	-	-	-	23	-	-	-	1533			23
	98	13	-	-	4	-	-	-	-	-	17	-	-	-	340			17
Y	85	3	-	-	-	-	-	-	-	-	3	-	-	-	200			3
	91	5	2	-	-	-	-	-	-	-	7	-	-	-	466			7
	98	37	-	-	7	-	-	1	-	-	45	-	-	-	900			45
M	85	9	9	-	-	-	-	-	-	-	18	-	-	-	1200	28	27	18
	91	9	6	-	-	-	-	-	-	-	15	-	-	-	1000	25	31	15
	98	75	22	2	13	-	-	-	-	-	109	1	2	-	2240	27	37	112
D	85	2	5	1	-	-	-	-	-	-	7	1	-	-	533			8
	91	5	4	2	-	-	-	-	-	-	6	-	1	4	733			11
	98	4	8	-	1	1	-	-	-	-	12	-	-	2	280			14
X	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	460			23

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	48%	03%	00%	+12%
'91	36%	06%	15%	+36%
'98	18%	01%	02%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'85	1933	Dec:	28%
	'91	2199		33%
	'98	3420		8%

Chrysothamnus viscidiflorus stenophyllus																		
S	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	3	-	-	-	-	-	-	-	3	-	-	-	200			3
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Y	85	1	-	-	-	-	-	-	-	-	1	-	-	-	66			1
	91	1	2	-	-	-	-	-	-	-	3	-	-	-	200			3
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
D	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	1	-	-	-	-	-	-	1	-	-	-	66			1
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	00%	00%	00%	+75%
'91	50%	25%	00%	
'98	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'85	66	Dec:	0%
	'91	266		25%
	'98	0		0%

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Juniperus osteosperma																		
S	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
Y	85	1	-	-	-	-	-	-	-	-	1	-	-	-	66			1
	91	2	-	-	-	-	-	-	-	-	2	-	-	-	133			2
	98	1	-	-	1	-	-	1	-	-	3	-	-	-	60			3
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	98	2	-	-	-	-	-	-	-	-	2	-	-	-	40	-	-	2

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	00%	00%	00%	+50%
'91	00%	00%	00%	-25%
'98	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'85	66	Dec:	-
	'91	133		-
	'98	100		-

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Opuntia whipplei																		
Y	85	1	-	-	-	-	-	-	-	-	1	-	-	-	66			1
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	0	6	8	0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	00%	00%	00%	
'91	00%	00%	00%	
'98	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'85	66	Dec:	-
	'91	0		-
	'98	0		-

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Pinus edulis																		
Y	85	1	-	-	-	-	-	-	-	-	1	-	-	-	66			1
	91	1	-	-	-	-	-	-	-	-	1	-	-	-	66			1
	98	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	00%	00%	00%	+ 0%
'91	00%	00%	00%	-70%
'98	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'85	66	Dec:	-
	'91	66		-
	'98	20		-

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Purshia tridentata																		
S	85	18	-	-	-	-	-	-	-	-	16	-	2	-	1200			18
	91	3	1	-	-	-	-	-	-	-	4	-	-	-	266			4
	98	4	-	-	1	-	-	-	-	-	5	-	-	-	100			5
Y	85	4	3	-	-	-	-	-	-	-	7	-	-	-	466			7
	91	1	-	2	-	-	-	-	-	-	3	-	-	-	200			3
	98	4	-	-	1	-	-	-	-	-	5	-	-	-	100			5
M	85	-	2	11	-	-	-	-	-	-	13	-	-	-	866	35	28	13
	91	-	-	-	-	2	3	-	-	-	5	-	-	-	333	26	30	5
	98	17	38	1	3	1	-	-	-	-	60	-	-	-	1200	41	53	60
D	85	-	-	2	-	-	-	-	-	-	2	-	-	-	133			2
	91	1	4	1	-	-	4	-	-	-	8	-	-	2	666			10
	98	3	2	1	1	-	-	-	-	-	7	-	-	-	140			7
X	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	100			5

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	23%	59%	00%	-18%
'91	33%	56%	11%	+17%
'98	57%	03%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'85	1465	Dec:	9%
	'91	1199		56%
	'98	1440		10%

Trend Study 22-10-98

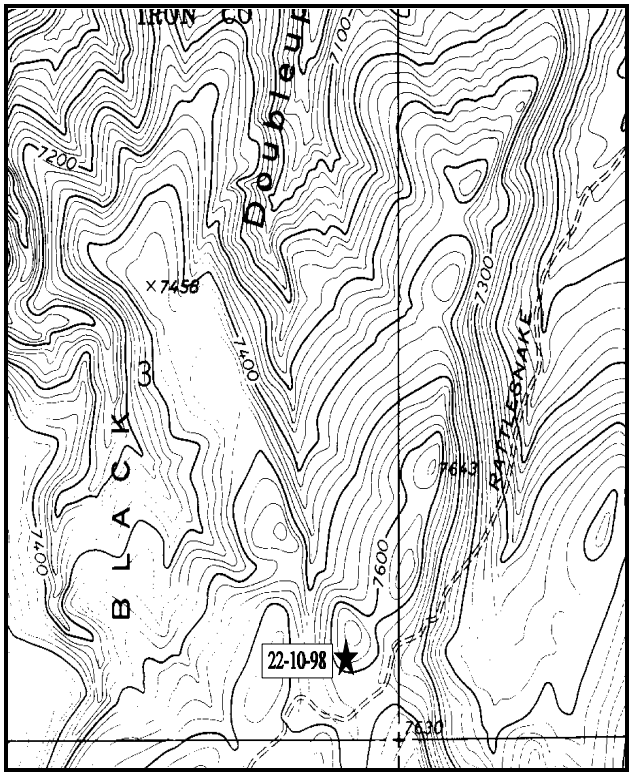
Study site name: Doubleup Hollow . Range type: Mixed Mountain Brush .

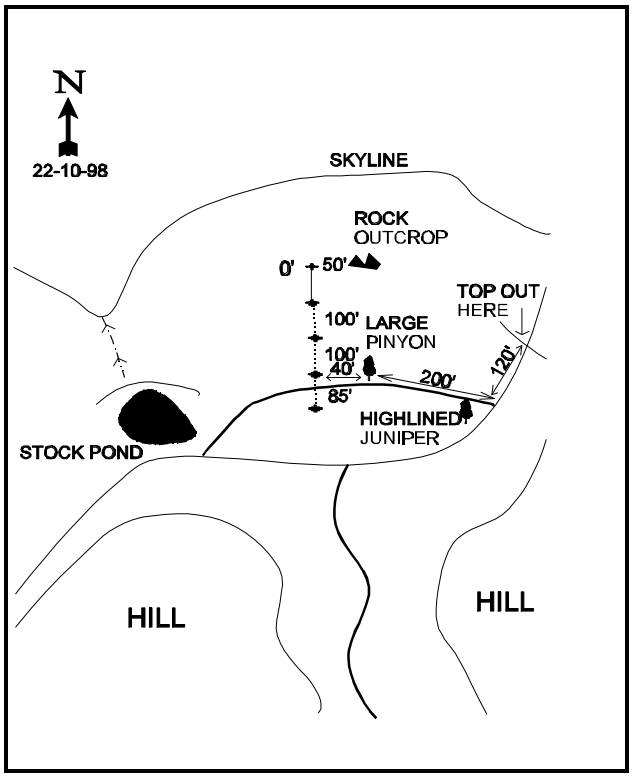
Compass bearing: frequency baseline 180 degrees.

Footmark (first frame placement) 5 feet. Frequency belt placement; line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

LOCATION DESCRIPTION

Start from the cattleguard in front of the Chevron Station on the west side of the I-15 interchange at the south end of Beaver. Turn left onto the frontage road and go 0.7 miles south, then 1.6 miles west. Go past the turnoff to the Beaver International Airport 0.2 mile to a corner then 0.2 miles south to an intersection. Turn right, paralleling a fence line and proceed 1.7 miles west to an intersection, turn left onto a major dirt road. Follow this main road (also known as the Rattlesnake Trail) for 6.7 miles, keeping to the right at all forks. At the fork near a small loading corral and water troughs, keep right again and go 1.4 miles to the top of the hill. From the half-high fencepost that marks the top, go 120 feet to a faint road forking off to the right. Go 200 feet on the faint road to a large round pinyon with a red stake under it and possibly an old Clover trap next to it. Walk about 200 feet straight up the hill (north) to a rock outcrop. The frequency baseline starts 50 feet to the west of these rocks. The 300-foot stake is rebar tagged #7075.





Map Name: Greenville Bench, Utah Diagrammatic Sketch

Township 31S , Range 8W , Section 3 UTM 4222014.839 N, 347593.208 E

DISCUSSION

Trend Study No. 22-10 (56B-3)

The Doubleup Hollow trend study samples an area of high deer winter range on the north end of the Black Mountains. The study is located on BLM administered land. There is not any higher elevation range in area, therefore the site would have year round use by resident deer. The vegetation in the hollow is a mixture of open patches of sagebrush interspersed with pinyon, juniper, and curlleaf mountain mahogany. The study site is on a rather open hillside with a slope of 5-10% and a southern aspect. Elevation is 7,600 feet. Grazing pressure appears light on this particular hillside with an estimated 18 deer days use/acre from a pellet group transect on the site in 1998. In the past, hedging on the browse plants reflected use by both deer and livestock, but there was no livestock sign encountered in 1998.

Large rock outcrops and the high percentage of rocks and pavement on the surface (32%) indicates the rockiness of the subsurface soil horizons. The upper soil is grayish brown, fine-textured, and loosely compacted. Soil textural analysis indicates a clay loam with a neutral pH (6.6). The average effective rooting depth (see methods) is almost 13 inches with an average soil temperature of 51.2°F at just over 13 inches. At a depth of approximately 10-12 inches there is an apparent hardpan or compacted layer. The vegetation and litter cover aid in soil stabilization and keep erosion to a minimum. Phosphorous levels in the soil profile measure 7.1 ppm and may be limiting to vegetative development because 10 ppm is thought to minimal for normal plant development.

The browse component is abundant and varied. The key browse species on the site are Antelope bitterbrush and mountain big sagebrush. The bitterbrush appears to still be the most preferred species although utilization has shifted from moderate-heavy in 1985 and 1991 to light-moderate in 1998. Percent decadency has shifted from 18% in 1991 to 5% in 1998 with the population currently exhibiting good vigor. In 1998, the Antelope bitterbrush showed abundant flowering. In the past, the sagebrush was identified as both black sagebrush and mountain big sagebrush. In 1998, it was determined that the majority of the sagebrush population was in fact mountain big sagebrush. The browse data tables refer to the sagebrush as both subspecies in 1985 and 1991. In 1998, the data tables refer to the population as predominately mountain big sagebrush. In 1985, it was reported that the sagebrush was producing a large amount of seed, which did not become established due to dry conditions. Currently, mountain big sagebrush shows light to moderately hedging and shows signs of improved vigor and lower percent decadency. Cover is estimated at nearly 24% in 1998. Insect galls are present on some plants and seedheads from the previous season still on the seed stalks. The slow decline of the sagebrush is strongly associated to the prolonged drought, and further accentuated on this site by the increased presence of many young junipers, pinyons, and oak. This indicates that this site is developing in a similar manner as much of the surrounding area.

Other valuable forage species present in lower numbers includes: curlleaf mountain mahogany, Gambel oak, and snowberry. Point-centered quarter data from 1998 indicates 13 Utah juniper trees/acre and 125 pinyon trees/acre. In 1998, line intercept canopy cover for Utah juniper and pinyon was estimated to be 2% and 8% respectively. Ten percent overhead canopy cover would easily cause about 40% decrease in understory production.

Bottlebrush squirreltail, which significantly decreased in nested frequency since 1991, is the most common perennial grass and occurs primarily under the crown of the sagebrush. There are several other species of perennial grasses present, but none are very common. Cheatgrass is scattered throughout, but it is small statured. Perennial grass sum of nested frequency has declined over all years. Forbs are rather scarce with the most common species encountered in 1998 being lupine. Perennial forb sum of nested frequency has more than doubled since 1991, but is still rather insignificant on the site as they barely total 2% cover.

1985 APPARENT TREND ASSESSMENT

The soil is stable and well-protected from erosion. However, the rocks on the surface are easily moved by disturbances such as trampling, and trails and erosion channels are easily formed. Large sagebrush openings still occupy much of the surrounding land, but these openings are apparently getting smaller. The relative abundance of the various browse species is slowly changing and the increase of pinyon and juniper indicates an overall slightly downward trend. The composition of grasses and forbs is fair and appears stable.

1991 TREND ASSESSMENT

The soil trend is slightly downward because vegetative basal cover is declining, litter cover is also decreasing, and percent bare ground has increased to 8%. Browse trend for all three key species is down. Black sagebrush, Mountain big sagebrush, and bitterbrush all experienced losses in their respective populations with corresponding increases in their rates of decadency and the percentage of individuals that are considered in poor vigor. Sum of nested frequency for both grasses and forbs has also declined substantially indicating a downward trend.

TREND ASSESSMENT
soil - slightly downward
browse - downward
herbaceous understory - downward

1998 TREND ASSESSMENT

The soil trend is stable with only slight changes in percent rock, pavement, and bare ground covers. Erosion is only slight with adequate vegetation and litter cover to protect the soil. The browse trend is stable. The decrease in bitterbrush is mostly because of the much larger sample size giving more accurate estimates of shrub densities which characteristically have discontinuous and/or clumped distributions. Also, the number of dead plants in the population can only explain about 18% of the decrease. Utilization by wildlife or livestock is significantly lower at this time than previously reported. Percent decadency and the percentage of plants exhibiting good vigor have improved since 1991. Percent vegetative cover for sagebrush is moderately high at an estimated 24% and will negatively affect the herbaceous understory production. The herbaceous understory trend is stable. Perennial grass sum of nested frequency has slightly declined while perennial forb sum of nested frequency has increased, offsetting the losses in the grasses.

TREND ASSESSMENT
soil - stable
browse - stable, decreased percent decadency and improved vigor for sagebrush and bitterbrush
herbaceous understory - stable

HERBACEOUS TRENDS --
Herd unit 22 , Study no: 10

Type	Species	Nested Frequency '85	'91	'98	Quadrat Frequency '85	'91	'98	Average Cover % '98
G	Agropyron spicatum	6	11	18	3	5	7	.35
G	Bouteloua gracilis	6	12	6	2	4	2	.01
G	Bromus tectorum (a)	-	-	96	-	-	39	1.78
G	Carex spp.	6	6	17	4	4	7	.26
G	Koeleria cristata	8	6	3	4	3	1	.00
G	Oryzopsis hymenoides	9	7	10	4	4	4	.02
G	Poa fendleriana	1	5	9	1	3	3	.30
G	Sitanion hystrix	$_{b}$140	$_{b}$113	$_{a}$78	63	55	37	1.53
Total for Annual Grasses		0	0	96	0	0	39	1.78
Total for Perennial Grasses		176	160	141	81	78	61	2.49
Total for Grasses		176	160	237	81	78	100	4.27
F	Arabis demissa	1	6	12	1	3	5	.05
F	Astragalus spp.	2	-	1	1	-	1	.00
F	Chaenactis douglasii	$_{b}$23	$_{a}$7	$_{ab}$6	11	3	5	.07
F	Cryptantha spp.	12	11	12	6	5	7	.08
F	Cymopterus spp.	-	-	7	-	-	3	.01
F	Descurainia pinnata (a)	-	-	3	-	-	1	.00
F	Epilobium paniculatum (a)	-	-	9	-	-	5	.05
F	Erigeron pumilus	4	-	4	2	-	3	.06
F	Lupinus argenteus	-	-	21	-	-	9	1.44
F	Lygodesmia spinosa	1	4	-	1	2	-	-
F	Machaeranthera canescens	10	-	4	5	-	3	.01
F	Microsteris gracilis (a)	-	-	6	-	-	2	.01
F	Penstemon spp.	4	-	4	2	-	3	.04
F	Petradoria pumila	-	-	4	-	-	2	.38
F	Phlox longifolia	3	2	2	1	2	2	.01
F	Senecio multilobatus	1	2	-	1	1	-	-
Total for Annual Forbs		0	0	18	0	0	8	0.06
Total for Perennial Forbs		61	32	77	31	16	43	2.18
Total for Forbs		61	32	95	31	16	51	2.25

Values with different subscript letters are significantly different at % = 0.10 (annuals excluded)

BROWSE TRENDS --
Herd unit 22 , Study no: 10

Type	Species	Strip Frequency ‘98	Average Cover % ‘98
B	Artemisia nova	3	.03
B	Artemisia tridentata vaseyana	87	23.73
B	Cercocarpus ledifolius	1	.41
B	Gutierrezia sarothrae	1	-
B	Juniperus osteosperma	2	1.70
B	Mahonia repens	1	.01
B	Opuntia spp.	3	-
B	Pinus edulis	2	6.09
B	Purshia tridentata	50	13.92
B	Symphoricarpos oreophilus	5	1.29
Total for Browse		155	47.20

CANOPY COVER --
Herd unit 22 , Study no: 10

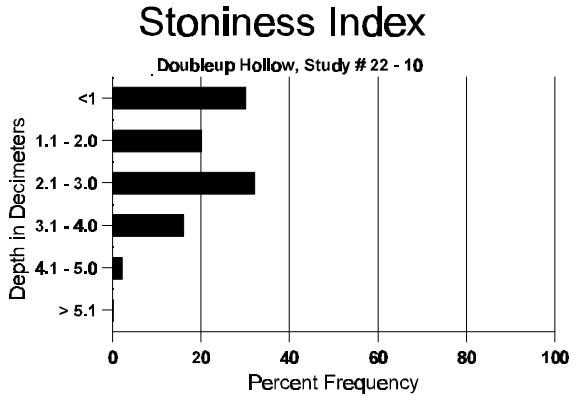
Species	Percent Cover '98
Juniperus osteosperma	2
Pinus edulis	8

BASIC COVER --
Herd unit 22 , Study no: 10

Cover Type	Nested Frequency '98	Average Cover % '85	'91	'98
Vegetation	249	3.75	3.25	45.72
Rock	221	9.75	14.25	12.25
Pavement	228	25.25	20.50	20.12
Litter	370	56.75	53.00	49.04
Cryptogams	10	0	1.00	.19
Bare Ground	113	4.50	8.00	6.00

SOIL ANALYSIS DATA --
Herd Unit 22, Study # 10, Study Name: Doubleup Hollow

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%0M	PPM P	PPM K	dS/m
12.7	51.2 (13.4)	6.6	44.0	27.4	28.6	2.7	7.1	204.8	.8



PELLET GROUP FREQUENCY --
Herd unit 22 , Study no: 10

Type	Quadrat Frequency '98
Rabbit	27
Elk	2
Deer	36

BROWSE CHARACTERISTICS --
Herd unit 22 , Study no: 10

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Artemisia nova																		
S	85	1	-	-	-	-	-	-	-	-	1	-	-	-	66			1
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Y	85	8	1	-	-	-	-	-	-	-	9	-	-	-	600			9
	91	-	-	-	1	-	-	-	-	-	1	-	-	-	66			1
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	85	28	12	1	-	-	-	-	-	-	40	-	1	-	2733	11	16	41
	91	7	11	4	3	1	-	-	-	-	26	-	-	-	1733	8	21	26
	98	3	-	-	-	-	-	-	-	-	3	-	-	-	60	10	13	3
D	85	16	8	-	-	-	-	-	-	-	12	-	8	4	1600			24
	91	14	2	-	3	-	-	3	-	-	5	-	-	17	1466			22
	98	3	-	-	-	-	-	-	-	-	1	-	-	2	60			3

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	28%	01%	18%	-34%
'91	29%	08%	35%	-96%
'98	00%	00%	33%	

Total Plants/Acre (excluding Dead & Seedlings)			Dec:	
	'85	4933		32%
	'91	3265		45%
	'98	120		50%

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Artemisia tridentata vaseyana																		
S	85	2	-	-	-	-	-	-	-	-	2	-	-	-	133			2
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	10	-	-	-	-	-	1	-	-	11	-	-	-	220			11
Y	85	4	-	-	-	-	-	-	-	-	4	-	-	-	266			4
	91	1	-	-	-	-	-	-	-	-	1	-	-	-	66			1
	98	6	-	-	-	-	-	-	-	-	6	-	-	-	120			6
M	85	6	9	2	-	-	-	-	-	-	17	-	-	-	1133	20	17	17
	91	6	2	-	5	3	-	-	-	-	16	-	-	-	1066	20	24	16
	98	77	39	-	24	-	-	1	-	-	140	-	1	-	2820	22	30	141
D	85	3	10	2	-	-	-	-	-	-	13	-	1	1	1000			15
	91	3	7	-	2	5	-	-	-	-	4	-	1	12	1133			17
	98	41	4	-	3	-	-	-	-	-	27	-	3	18	960			48
X	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	-	1	-	-	-	-	-	-	-	1	-	-	-	1240			62

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	53%	11%	06%	- 6%
'91	50%	00%	38%	+42%
'98	22%	00%	11%	

Total Plants/Acre (excluding Dead & Seedlings)				
'85	2399	Dec:		42%
'91	2265			50%
'98	3900			25%

Cercocarpus ledifolius																		
S	85	3	-	-	-	-	-	-	-	-	3	-	-	-	200			3
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Y	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	1	-	-	1	-	-	-	66			1
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	98	1	-	-	-	-	-	-	-	-	1	-	-	-	20	48	53	1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	00%	00%	00%	
'91	00%	00%	00%	-70%
'98	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
'85	0	Dec:		-
'91	66			-
'98	20			-

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Gutierrezia sarothrae																		
Y	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	91	4	-	-	1	-	-	-	-	-	5	-	-	-	333	10	8	5
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	00%	00%	00%	
'91	00%	00%	00%	-94%
'98	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'85	0	Dec:	-
	'91	333		-
	'98	20		-

Juniperus osteosperma																		
Y	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	98	-	-	-	-	-	-	-	1	-	1	-	-	-	20	-	-	1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	00%	00%	00%	
'91	00%	00%	00%	
'98	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'85	0	Dec:	-
	'91	0		-
	'98	40		-

Mahonia repens																		
Y	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	98	5	-	-	-	-	-	-	-	-	5	-	-	-	100	-	-	5

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	00%	00%	00%	
'91	00%	00%	00%	
'98	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'85	0	Dec:	-
	'91	0		-
	'98	120		-

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Opuntia spp.																		
Y	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	98	3	-	-	-	-	-	-	-	-	3	-	-	-	60	5	14	3

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	00%	00%	00%	
'91	00%	00%	00%	
'98	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'85	0	Dec:	-
	'91	0		-
	'98	80		-

Pinus edulis																		
Y	85	2	-	-	-	-	-	-	-	-	2	-	-	-	133			2
	91	2	-	-	-	-	-	-	-	-	2	-	-	-	133			2
	98	3	-	-	-	-	-	-	-	-	3	-	-	-	60			3

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	00%	00%	00%	+ 0%
'91	00%	00%	00%	-55%
'98	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'85	133	Dec:	-
	'91	133		-
	'98	60		-

Purshia tridentata																		
S	85	7	-	-	-	-	-	-	-	-	7	-	-	-	466			7
	91	-	-	-	1	-	-	-	-	-	1	-	-	-	66			1
	98	7	-	-	2	-	-	-	-	-	9	-	-	-	180			9
Y	85	8	9	2	-	-	-	-	-	-	19	-	-	-	1266			19
	91	1	2	1	-	-	-	1	-	-	5	-	-	-	333			5
	98	5	2	-	2	-	-	1	-	-	10	-	-	-	200			10
M	85	2	16	26	-	-	-	-	-	-	43	-	1	-	2933	24	26	44
	91	-	11	3	3	9	1	-	-	-	27	-	-	-	1800	27	51	27
	98	37	21	-	3	2	-	-	-	-	63	-	-	-	1260	34	45	63
D	85	-	-	1	-	-	-	-	-	-	1	-	-	-	66			1
	91	-	3	1	-	-	2	-	-	1	5	-	-	2	466			7
	98	1	-	1	2	-	-	-	-	-	3	-	-	1	80			4
X	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	200			10

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	39%	45%	02%	-39%
'91	64%	23%	05%	-41%
'98	32%	01%	01%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'85	4265	Dec:	2%
	'91	2599		18%
	'98	1540		5%

Symphoricarpos oreophilus

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	98	7	1	-	-	-	-	-	-	-	8	-	-	-	160	12	25	8

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor
'85	00%	00%	00%
'91	00%	00%	00%
'98	13%	00%	00%

Total Plants/Acre (excluding Dead & Seedlings)			%Change
	'85	0	Dec: -
	'91	0	-
	'98	160	-

Trend Study 22-11-98

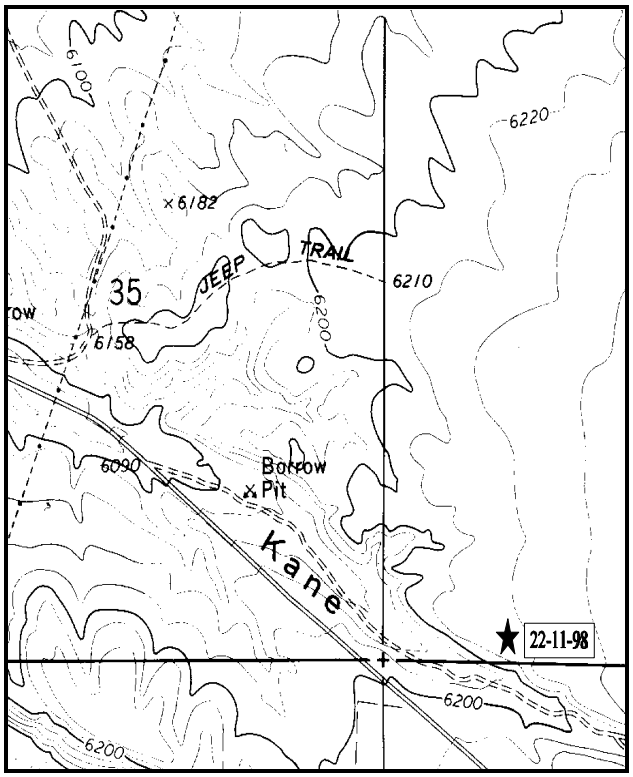
Study site name: "B" Hill . Range type: Big Sagebrush-Grass .

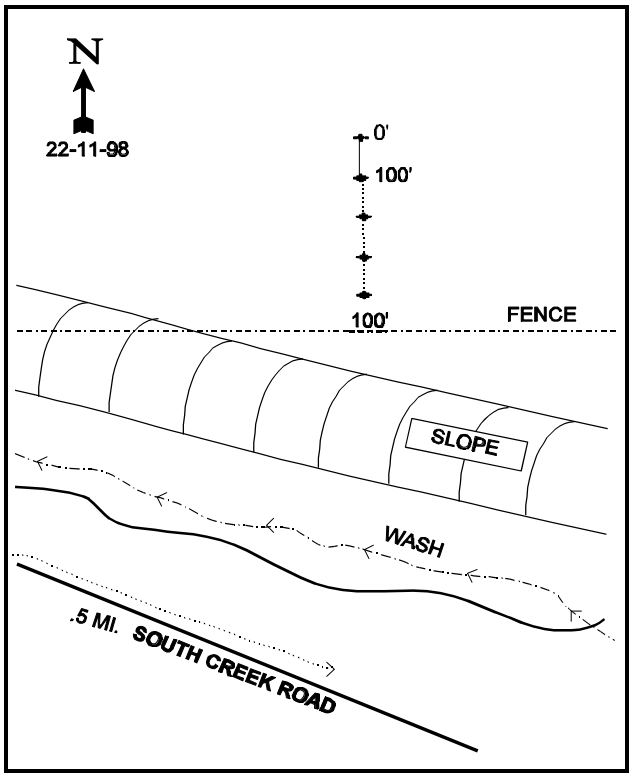
Compass bearing: frequency baseline 180 degrees.

Footmark (first frame placement) 5 feet. Frequency belt placement; line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

LOCATION DESCRIPTION

Starting from Beaver High School on Main Street, go south 1.6 miles. On the east side of the road there is a rock monument commemorating the "Lee's Ranch Indian Raid". Turn east at the monument onto South Creek Road. Go 0.6 miles to a three-way fork, keep right on the main road. Proceed 1.3 miles to another fork and turn right. Go 0.4 miles and turn left onto a poorly maintained road. This road is now impassable (actually a wash bottom), so continue down the main road until you see a fence braced by wooded cross-members on the hill to the left. Hike up the hill. From the left wood post go 100 feet at 360 degrees true to the 400-foot stake. The study is marked by 2 1/2-foot rebar, 100 feet apart. The 0-foot baseline stake is marked by a short rebar tagged #7059.





Map Name: Kane Canyon, Utah

Diagrammatic Sketch

Township 29S , Range 7W , Section 36

UTM 4233070.021 N, 360208.618 E

DISCUSSION

Trend Study No. 22-11 (56B-4)

The "B" Hill study is located on a section of DWR land which is part of the critical and limited deer winter range south of Beaver and east of I-15. Deer concentrate here in the South Creek area in the winter with the accompanying problems of spring crop depredation and generally overuse on the range. The range type is sagebrush-grass. A pinyon-juniper eradication project was done in 1959 and the site was aerially seeded. Some locations were harrowed and drilled. The wash just to the south of the study site contains an open stand of Utah junipers and provides the only cover near the flat. The site is nearly level with only a slight slope to the west. Elevation is 6,200 feet. The "B" Hill pellet group transect, which samples a slightly higher elevation area near the study site, averaged 53 deer days use/acre from 1980 through 1985 (Jense et al. 1985). Deer days use/acre appears to have increased since 1985 to an average of 55 deer days use/acre (Jense et al. 1991). The pellet transect was not read in 1992. From 1993 through 1997, deer averaged 17 days use/acre (Evans et al. 1997). A pellet group transect read on the site in 1998 estimated 5 deer days use/acre and 13 cow days use/acre.

Due to the levelness of the terrain, runoff and the hazard of erosion is low. The soil surface and profile are very rocky and there are current signs of pedestaling around some of the plants. Soil textural analysis indicates a sandy clay loam with a neutral pH (7.1). Average effective rooting depth (see methods) is a little over 13 inches with an average soil temperature of 39.6°F at 14 inches. Phosphorous levels in the soil profile measure 4.6 ppm and may be limiting to vegetative development because 10 ppm is considered minimal for normal plant growth. There appears to be a hardpan at just over one foot from the soil surface.

Wyoming big sagebrush is the only key browse species on the site. In 1998, the Wyoming big sagebrush population is estimated to be 1,200 plants/acre and appears to be a stable to slightly expanding population. The percentage of plants in poor vigor has increased to 13% in 1998, where it was 0% in 1985 and 1991. The plants average 18 inches in height and appear rather stunted. They were moderately hedged in the past, but utilization of the current years growth is now light to moderate. More young and seedling plants were encountered in 1998 than in any other year, which should indicate the population could slightly increase in the future. Broom snakeweed is also present but in low abundance. A few bitterbrush and young Utah junipers can also be found along the fence.

The most common grasses are crested wheatgrass, Russian wildrye, intermediate wheatgrass, and western wheatgrass. Intermediate wheatgrass has significantly increased in nested frequency, while western wheatgrass and Russian wildrye have significantly declined in nested frequency since 1991. Indian ricegrass occurs occasionally. Growth and production is likely depressed as a result of overgrazing with the accompanying prolonged drought. In 1985, the plants were short, but seed production appeared to have been good. Perennial grass sum of nested frequency has declined since 1991 and is lower than what was reported in 1985. Forbs, except for a small scarlet globemallow and heath aster, are rare.

1985 APPARENT TREND ASSESSMENT

.

The soil trend is stable due mostly to the relatively level terrain. The vegetative condition has the potential to improve if livestock grazing is eliminated for a few years. Increased enforcement of regulations and fence repairs should help curtail the trespass problems. There is a lack of diversity in the vegetative community, but competition with seeded species should keep annuals and other invaders from increase. A rest from livestock grazing would allow the sagebrush and various grasses present to regain vigor, reproduce, and build up litter.

1991 TREND ASSESSMENT

The soil trend for the site is down even with the increase in basal vegetative cover, because litter cover has decreased to only 20% and percent bare ground has doubled to 40%. There is only one key browse species present, Wyoming big sagebrush, which has demonstrated declining numbers and vigor with increased decadency. Trend for browse is slightly down. The trend for both grasses and forbs is slightly up with increased nested frequency values.

TREND ASSESSMENT
soil - downward
browse - slightly downward
herbaceous understory - slightly upward

1998 TREND ASSESSMENT

The soil trend is slightly upward with a decrease in percent bare ground cover since 1991. Percent rock and pavement cover combined have declined as well. There are some signs of pedestaling, but the levelness of the site prevents excessive erosion from occurring. The browse trend is stable. Wyoming big sagebrush density has increased slightly since 1991, but still remains low. Currently, it only accounts for 3% cover. Percent decadency has remained the same while the percentage of plants reported in poor vigor has increased to 13%. The herbaceous understory trend is downward. Perennial herbaceous understory sum of nested frequency is currently lower than what was reported in any other year. Grasses dominate the site and individual species have shifted slightly over the years.

TREND ASSESSMENT
soil - slightly upward
browse - stable
herbaceous understory - downward

HERBACEOUS TRENDS --
Herd unit 22 , Study no: 11

Type	Species	Nested Frequency '85	'91	'98	Quadrat Frequency '85	'91	'98	Average Cover % '98
G	Agropyron cristatum	205	198	211	81	75	72	18.53
G	Agropyron dasystachyum	b15	a-	a-	8	-	-	-
G	Agropyron intermedium	a4	a14	b37	3	7	17	.38
G	Agropyron smithii	b73	c140	a37	30	50	17	.50
G	Agropyron spicatum	-	-	1	-	-	1	.00
G	Agropyron trachycaulum	-	-	2	-	-	1	.03
G	Aristida purpurea	-	3	-	-	1	-	-
G	Bromus tectorum (a)	-	-	15	-	-	5	.45
G	Elymus junceus	b152	b168	a96	59	62	38	3.58
G	Oryzopsis hymenoides	26	28	14	11	13	7	.58
G	Poa fendleriana	7	-	4	3	-	2	.03
G	Sitanion hystrix	-	-	2	-	-	1	.00
G	Stipa comata	3	7	4	1	3	3	.18

Type	Species	Nested Frequency '85	'91	'98	Quadrat Frequency '85	'91	'98	Average Cover % '98
Total for Annual Grasses		0	0	15	0	0	5	0.45
Total for Perennial Grasses		485	558	408	196	211	159	23.84
Total for Grasses		485	558	423	196	211	164	24.29
F	Astragalus cibarius	11	2	8	6	2	6	.13
F	Cryptantha spp.	2	2	-	1	1	-	-
F	Cymopterus spp.	-	-	1	-	-	1	.00
F	Leucelene ericoides	$_{a}$33	$_{b}$66	$_{a}$30	13	31	14	.29
F	Orobanche fasciculata	-	-	1	-	-	1	.00
F	Phlox longifolia	$_{a}$-	$_{b}$11	$_{ab}$3	-	5	2	.01
F	Phlox spp.	-	1	-	-	1	-	-
F	Ranunculus testiculatus (a)	-	-	16	-	-	6	.03
F	Schoencrambe linifolia	-	-	2	-	-	1	.00
F	Sisymbrium altissimum (a)	-	-	2	-	-	1	.03
F	Sphaeralcea coccinea	$_{b}$131	$_{b}$131	$_{a}$57	51	56	23	.41
Total for Annual Forbs		0	0	18	0	0	7	0.06
Total for Perennial Forbs		177	213	102	71	96	48	0.86
Total for Forbs		177	213	120	71	96	55	0.92

Values with different subscript letters are significantly different at % = 0.10 (annuals excluded)

BROWSE TRENDS --
Herd unit 22 , Study no: 11

Type	Species	Strip Frequency '98	Average Cover % '98
B	Artemisia tridentata wyomingensis	44	3.05
B	Gutierrezia sarothrae	4	.03
Total for Browse		48	3.08

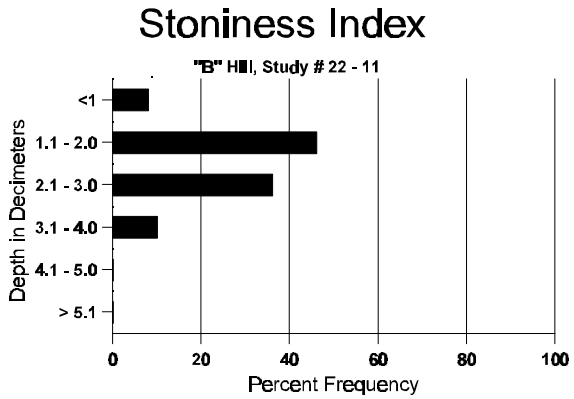
BASIC COVER --
Herd unit 22 , Study no: 11

Cover Type	Nested Frequency '98	Average Cover % '85	'91	'98
Vegetation	327	8.25	14.50	36.55
Rock	215	3.50	2.75	6.62
Pavement	335	34.00	22.00	12.07
Litter	377	34.50	19.50	22.30
Cryptogams	253	0	1.50	7.95
Bare Ground	329	19.75	39.75	29.41

SOIL ANALYSIS DATA --

Herd Unit 22, Study # 11, Study Name: “B” Hill

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%0M	PPM P	PPM K	dS/m
13.3	39.6 (14.0)	7.1	52.0	23.4	24.6	1.9	4.6	211.2	.8



PELLET GROUP FREQUENCY --
Herd unit 22 , Study no: 11

Type	Quadrat Frequency ‘98
Rabbit	16
Deer	15
Cattle	2

BROWSE CHARACTERISTICS --
Herd unit 22 , Study no: 11

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Artemisia tridentata wyomingensis																		
S	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
Y	85	2	-	-	-	-	-	-	-	-	2	-	-	-	133			2
	91	1	-	-	-	-	-	-	-	-	1	-	-	-	66			1
	98	12	-	-	-	-	-	-	-	-	12	-	-	-	240			12
M	85	1	10	1	-	-	-	-	-	-	12	-	-	-	800	20	22	12
	91	2	6	1	-	-	-	-	-	-	9	-	-	-	600	24	27	9
	98	25	5	5	-	-	-	-	-	-	35	-	-	-	700	18	31	35
D	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	2	-	-	1	-	-	-	-	3	-	-	-	200			3
	98	4	3	2	-	-	4	-	-	-	5	-	-	8	260			13
X	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	40			2

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	71%	07%	00%	- 7%
'91	69%	08%	00%	+28%
'98	13%	18%	13%	

Total Plants/Acre (excluding Dead & Seedlings)				
'85	933	Dec:		0%
'91	866			23%
'98	1200			22%

Gutierrezia sarothrae																		
Y	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	98	5	-	-	-	-	-	-	-	-	5	-	-	-	100	8	9	5

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	00%	00%	00%	
'91	00%	00%	00%	
'98	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)			
'85	0	Dec:	-
'91	0		-
'98	120		-

Trend Study 22-12-98

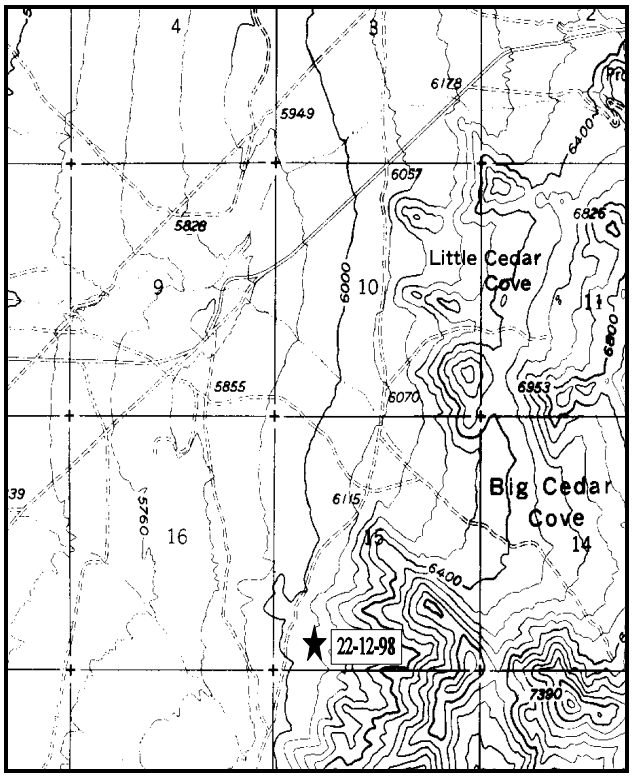
Study site name: Big Cedar Cove . Range type: Big Sagebrush-Grass .

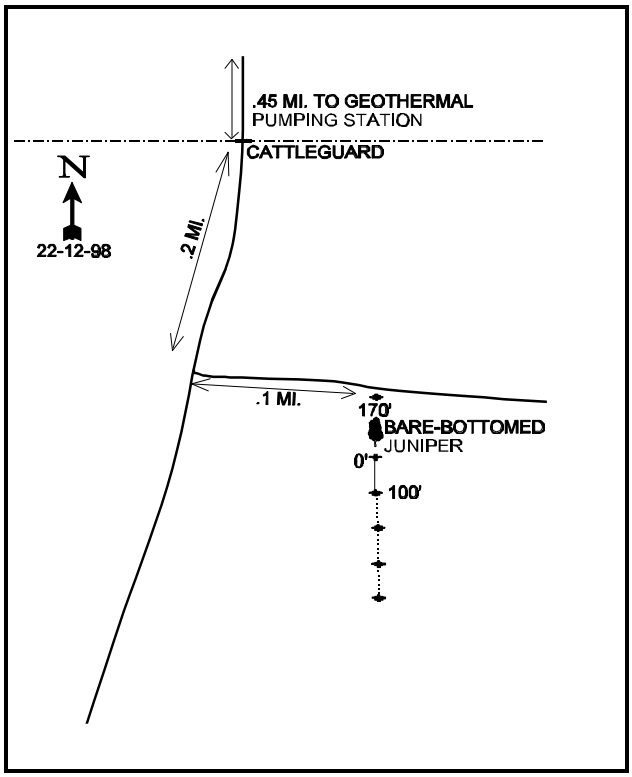
Compass bearing: frequency baseline 180 degrees.

Footmark (first frame placement) 5 feet. Frequency belt placement; line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

LOCATION DESCRIPTION

From mile marker 4 on SR257 north of Milford, go 0.55 miles north. Turn right (Roosevelt Hot Springs Road) and drive 2.65 miles to a major fork. Continue straight and go 5.0 miles. Just across the cattleguards turn right and go 1.0 miles to a 4-way fork. Turn right and continue 0.45 miles (past Phillips Oil well-head on the right) to another cattleguard. Go another 0.20 miles to a junction. Turn left and drive 0.1 miles. Stop here. The transect starts 170 feet due south of the road beside a highlined juniper tree. The 0-foot baseline stake is a steel rebar three feet tall with a browse tag #7079 attached.





Map Name: Bearskin Mountain, Utah Diagrammatic Sketch

Township 27S , Range 9W , Section 15 UTM 4257959.182 N, 337936.683 E

DISCUSSION

Trend Study No. 22-12 (56C-1/48-12)

The Big Cedar Cove trend study is located on the sagebrush-grass range that covers the gentle slopes of the foothills on the west side of the Mineral Mountains. The study has a southwest exposure at an elevation of 6,000 feet. The site, along with most of the land on the Mineral Mountains, is administered by the BLM. The area is grazed by cattle in the spring, but the scarcity of water may limit use. Deer use appears light with 12 deer days use/acre and 6 cow days use/acre estimated in 1998 on a pellet transect read on the site. A geothermal plant is located nearby and has the potential to impact deer in the area through habitat loss and increased disturbance.

Soil textural analysis indicates a sandy loam soil with a neutral pH (6.7). The soil is relatively deep and coarse with 49% of the soil surface covered with pavement and rocks. Effective rooting depth (see methods) is 19 inches with a soil temperature of 45.4°F at 17 inches. Vegetative growth may be limited due to relatively low amounts of phosphorous (7.5 ppm). There are signs of pedestaling around the bunchgrasses and browse plants. The soil is slightly eroded, showing signs of sheet erosion which likely occurs during high intensity summer thunderstorms.

A moderately dense stand of Wyoming big sagebrush dominates the site. In 1985, close to 25% of the population were young plants, with 35% classified as decadent. No seedlings were found in 1991 with young plants accounting for 16% of the population. Furthermore, over half of the sagebrush on the site are were decadent (53%), a 34% increase, while plants classified as having poor vigor have increased to 39%. Currently, sagebrush canopy cover is estimated to be 16%. Mature sagebrush average 22 inches in height, display generally good vigor, and are light to moderately browsed. Although percent decadence has declined to 37% of the population, few seedling or young plants were encountered in 1998. The shrub interspaces are occupied by various invaders such as narrowleaf low rabbitbrush, broom snakeweed, prickly phlox, and young pinyon pine. Broom snakeweed density is currently estimated to be 10,080 plants/acre, a great increase from previous years. This species has a highly fluctuating density depending on weather patterns. Ephedra density is currently estimated to be 320 plants/acre and plants show moderate utilization. Point-centered quarter data from 1991 estimate 39 pinyon trees/acre and 16 Utah juniper trees/acre. In 1998, point-centered quarter data estimate 54 pinyon trees/acre and 19 Utah juniper trees/acre.

Perennial grasses occur mainly under the protection of sagebrush crowns. Nested frequency values have improved since 1985. The more common species are Sandberg bluegrass, galleta, and bottlebrush squirreltail. Cheatgrass appears as the most abundant herbaceous species, providing 36% of the herbaceous understory cover and 13% of the total vegetative cover. Only five forbs were sampled in 1985. Ten forbs were sampled during the 1991 and 1998 reading. Some of the more abundant forbs includes: long leaf phlox, low fleabane, and an astragalus species.

1985 APPARENT TREND ASSESSMENT

All of the soil trend parameters indicate a stable condition. Vegetative trend may be slowly declining as the populations of various undesirable plants, including pinyon pine and cheatgrass seem to be on the increase.

1991 TREND ASSESSMENT

The soil trend appears slightly down due to litter cover decreasing by 18% and bare ground increasing by over 50%. The key browse species, Wyoming big sagebrush, shows only a slight increase in population (3%), a decreased reproductive potential, increased decadence, and plants with poor vigor have increased to 39%. These factors all indicate a slightly downward trend. The trend for grasses and forbs are up due to increased nested frequency values, but it is still in very poor condition, especially for the forbs.

TREND ASSESSMENT
soil - slightly down
browse - slightly down
herbaceous understory - upward, but still poor condition

1998 TREND ASSESSMENT

The soil trend is slightly downward with a slight increase in percent bare ground, rock, and pavement cover. Due to a recent rainstorm in 1998, cryptogams were more easily identified and common, including mosses, lichens, and mushrooms. The browse trend is considered stable. The Wyoming big sagebrush population still exhibits relatively high percent decadency, but appears to be recovering from poor conditions reported in 1991. Although the broom snakeweed density has greatly increased, these are small plants and provide very little cover to the site. Broom snakeweed density can fluctuate highly and this population will likely show great increases and decreases in the future. The herbaceous understory trend is stable. The perennial herbaceous understory sum of nested frequency has changed very little since 1991.

TREND ASSESSMENT
soil - slightly downward
browse - stable, Wyoming big sagebrush percent decadence is still high
herbaceous understory - stable, but still poor condition

HERBACEOUS TRENDS --
Herd unit 22 , Study no: 12

Type	Species	Nested Frequency '85	'91	'98	Quadrat Frequency '85	'91	'98	Average Cover % '98
G	Aristida purpurea	13	17	19	6	9	8	.66
G	Bromus tectorum (a)	-	-	308	-	-	95	4.59
G	Hilaria jamesii	56	61	65	26	23	28	1.18
G	Oryzopsis hymenoides	-	4	5	-	2	3	.19
G	Poa secunda	a68	b116	b137	29	52	57	3.09
G	Sitanion hystrix	a41	b75	ab68	19	35	35	1.93
G	Stipa comata	a11	b29	a14	6	11	6	.16
Total for Annual Grasses		0	0	308	0	0	95	4.59
Total for Perennial Grasses		189	302	308	86	132	137	7.22
Total for Grasses		189	302	616	86	132	232	11.81
F	Agoseris glauca	3	-	-	1	-	-	-
F	Agoseris spp.	-	7	-	-	3	-	-
F	Arabis demissa	2	-	2	1	-	1	.00
F	Astragalus spp.	-	4	7	-	2	2	.06
F	Castilleja chromosa	-	-	3	-	-	2	.03
F	Calochortus nuttallii	1	5	1	1	2	1	.00
F	Crepis spp.	-	4	-	-	1	-	-
F	Delphinium nuttallianum	-	5	-	-	3	-	-
F	Erigeron pumilus	3	5	10	1	2	4	.59

Type	Species	Nested Frequency '85	'91	'98	Quadrat Frequency '85	'91	'98	Average Cover % '98
F	Lomatium spp.	-	1	2	-	1	2	.01
F	Lupinus argenteus	-	-	1	-	-	1	.00
F	Microsteris gracilis (a)	-	-	1	-	-	1	.00
F	Navarretia intertexta (a)	-	-	12	-	-	5	.05
F	Phlox longifolia	$_{a}$-	$_{b}$31	$_{b}$23	-	16	12	.11
F	Sphaeralcea coccinea	-	-	-	-	-	-	.00
F	Zigadenus paniculatus	3	-	-	1	-	-	-
Total for Annual Forbs		0	0	13	0	0	6	0.05
Total for Perennial Forbs		12	62	49	5	30	25	0.83
Total for Forbs		12	62	62	5	30	31	0.89

Values with different subscript letters are significantly different at % = 0.10 (annuals excluded)

BROWSE TRENDS --
Herd unit 22 , Study no: 12

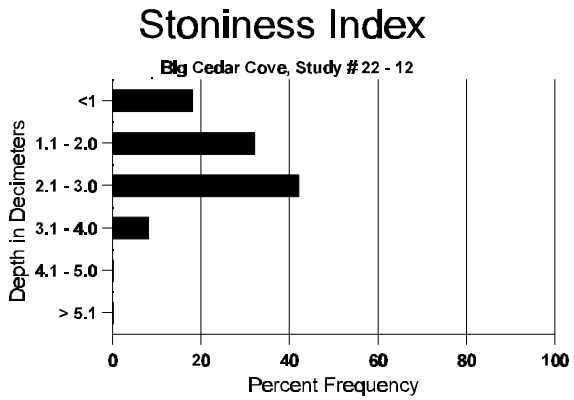
Type	Species	Strip Frequency '98	Average Cover % '98
B	Amelanchier utahensis	1	-
B	Artemisia tridentata wyomingensis	87	16.49
B	Chrysothamnus viscidiflorus stenophyllus	36	1.00
B	Ephedra fasciculata fasciculata	7	.74
B	Gutierrezia sarothrae	61	3.37
B	Juniperus osteosperma	1	-
B	Leptodactylon pungens	1	-
B	Opuntia spp.	7	-
B	Pinus edulis	3	.58
B	Ribes cereum cereum	1	-
Total for Browse		205	22.21

BASIC COVER --
Herd unit 22 , Study no: 12

Cover Type	Nested Frequency '98	Average Cover % '85	'91	'98
Vegetation	346	3.00	6.00	31.45
Rock	158	2.00	3.25	5.42
Pavement	352	37.50	35.75	43.72
Litter	386	51.25	42.25	36.46
Cryptogams	142	0	0	1.37
Bare Ground	298	6.25	12.75	13.13

SOIL ANALYSIS DATA --
Herd Unit 22, Study # 12, Study Name: Big Cedar Cove

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%0M	PPM P	PPM K	dS/m
18.8	45.4 (16.7)	6.7	62.7	20.7	16.6	1.8	7.5	96.0	.6



PELLET GROUP FREQUENCY --
Herd unit 22 , Study no: 12

Type	Quadrat Frequency '98
Rabbit	28
Deer	21
Cattle	1

BROWSE CHARACTERISTICS --
Herd unit 22 , Study no: 12

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Amelanchier utahensis																		
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	98	1	-	-	-	-	-	-	-	-	1	-	-	-	20	-	-	1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	00%	00%	00%	
'91	00%	00%	00%	
'98	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'85	0	Dec:	-
	'91	0		-
	'98	20		-

Artemisia tridentata wyomingensis																		
S	85	2	-	-	-	-	-	-	-	-	2	-	-	-	133			2
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	4	-	-	1	-	-	-	-	-	5	-	-	-	100			5
Y	85	9	4	-	-	-	-	-	-	-	13	-	-	-	866			13
	91	3	5	-	2	-	-	-	-	-	10	-	-	-	666			10
	98	1	-	-	1	-	-	-	-	-	1	1	-	-	40			2
M	85	5	18	3	-	-	-	-	-	-	26	-	-	-	1733	21	26	26
	91	1	10	1	3	4	-	-	-	-	19	-	-	-	1266	17	20	19
	98	71	36	-	-	-	-	-	-	-	105	-	1	-	2140	22	34	107
D	85	1	16	4	-	-	-	-	-	-	21	-	-	-	1400			21
	91	1	13	5	2	8	3	1	-	-	9	-	-	24	2200			33
	98	44	17	3	1	-	-	-	-	-	45	2	1	17	1300			65
X	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	600			30

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	63%	12%	00%	+ 3%
'91	65%	15%	39%	-16%
'98	30%	02%	11%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'85	3999	Dec:	35%
	'91	4132		53%
	'98	3480		37%

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Chrysothamnus viscidiflorus stenophyllus																		
Y	85	2	-	-	-	-	-	-	-	-	2	-	-	-	133			2
	91	1	-	-	-	-	-	-	-	-	1	-	-	-	66			1
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	85	13	2	-	-	-	-	-	-	-	14	1	-	-	1000	8	10	15
	91	5	3	-	1	-	-	-	-	-	5	1	3	-	600	9	11	9
	98	38	-	-	2	-	-	-	-	-	35	-	-	-	800	12	19	40
D	85	2	8	-	-	-	-	-	-	-	6	-	4	-	666			10
	91	5	2	1	3	-	-	1	-	-	4	-	-	8	800			12
	98	5	-	-	-	-	-	-	-	-	2	-	-	3	100			5
X	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	20			1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	37%	00%	15%	-19%
'91	23%	05%	50%	-39%
'98	00%	00%	07%	

Total Plants/Acre (excluding Dead & Seedlings)				
'85	1799	Dec:		37%
'91	1466			55%
'98	900			11%

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Ephedra fasciculata fasciculata																		
S	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	2	-	-	-	-	-	-	-	-	2	-	-	-	40			2
Y	85	-	1	-	-	-	-	-	-	-	1	-	-	-	66			1
	91	-	4	-	-	-	-	-	-	-	4	-	-	-	266			4
	98	4	4	-	-	-	-	-	-	-	8	-	-	-	160			8
M	85	-	3	-	-	-	-	-	-	-	3	-	-	-	200	15	11	3
	91	-	4	-	-	-	-	-	-	-	4	-	-	-	266	15	14	4
	98	1	2	4	-	-	-	-	-	-	4	-	3	-	140	20	27	7
D	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	-	1	-	-	-	-	-	-	-	-	-	1	-	20			1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	100%	00%	00%	+50%
'91	100%	00%	00%	-40%
'98	44%	25%	25%	

Total Plants/Acre (excluding Dead & Seedlings)				
'85	266	Dec:		0%
'91	532			0%
'98	320			6%

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Gutierrezia sarothrae																		
S	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	8	-	-	-	-	-	-	-	-	8	-	-	-	160			8
Y	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	2	-	-	-	-	-	-	-	-	2	-	-	-	133			2
	98	100	-	-	-	-	-	-	-	-	100	-	-	-	2000			100
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	91	3	-	-	-	-	-	-	-	-	1	-	2	-	200	9	7	3
	98	400	-	-	-	-	-	-	-	-	400	-	-	-	8000	8	9	400
D	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	2	-	-	1	-	-	-	-	-	-	-	-	3	200			3
	98	4	-	-	-	-	-	-	-	-	2	-	-	2	80			4
X	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	80			4

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	00%	00%	00%	
'91	00%	00%	63%	+95%
'98	00%	00%	.39%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'85	0	Dec:	0%
	'91	533		38%
	'98	10080		1%

Juniperus osteosperma																		
Y	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	00%	00%	00%	
'91	00%	00%	00%	
'98	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'85	0	Dec:	-
	'91	0		-
	'98	20		-

Leptodactylon pungens																		
Y	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
M	85	1	-	-	-	-	-	-	-	-	1	-	-	-	66	9	5	1
	91	-	-	-	3	-	-	-	-	-	3	-	-	-	200	7	5	3
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	0	9	10	0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	00%	00%	00%	+67%
'91	00%	00%	00%	-90%
'98	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'85	66	Dec:	-
	'91	200		-
	'98	20		-

Opuntia spp.

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	98	6	-	-	1	-	-	-	-	-	7	-	-	-	140	6	10	7

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	00%	00%	00%	
'91	00%	00%	00%	
'98	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'85	0	Dec:	-
	'91	0		-
	'98	140		-

Pinus edulis

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Y	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	2	-	-	-	-	-	-	-	-	2	-	-	-	40			2
M	85	1	-	-	-	-	-	-	-	-	1	-	-	-	66	69	71	1
	91	-	-	-	1	-	-	-	-	-	1	-	-	-	66	116	75	1
	98	1	-	-	-	-	-	-	-	-	1	-	-	-	20	-	-	1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	00%	00%	00%	+ 0%
'91	00%	00%	00%	- 9%
'98	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'85	66	Dec:	-
	'91	66		-
	'98	60		-

Ribes cereum cereum

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	98	6	-	-	-	-	-	-	-	-	6	-	-	-	120	-	-	6

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	00%	00%	00%	
'91	00%	00%	00%	
'98	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'85	0	Dec:	-
	'91	0		-
	'98	120		-

Trend Study 22-13-98

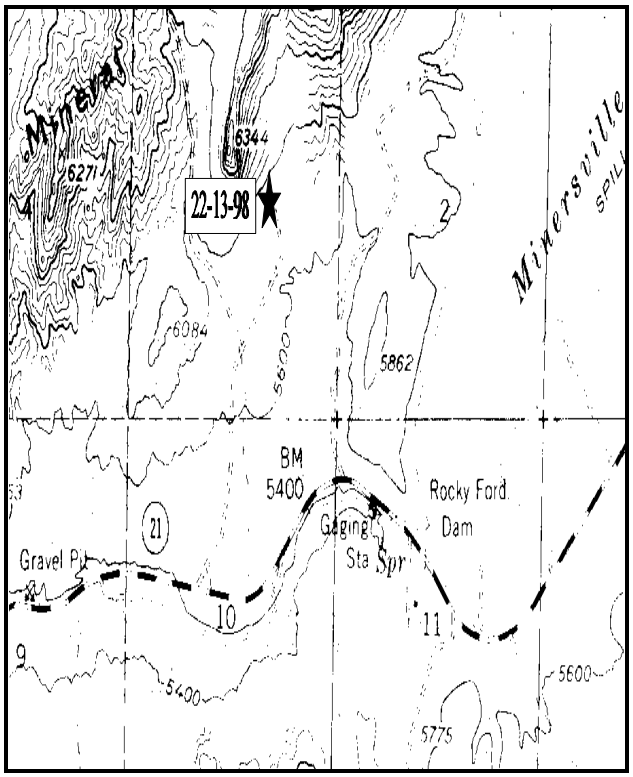
Study site name: Minersville Reservoir . Range type: Big Sagebrush-Grass .

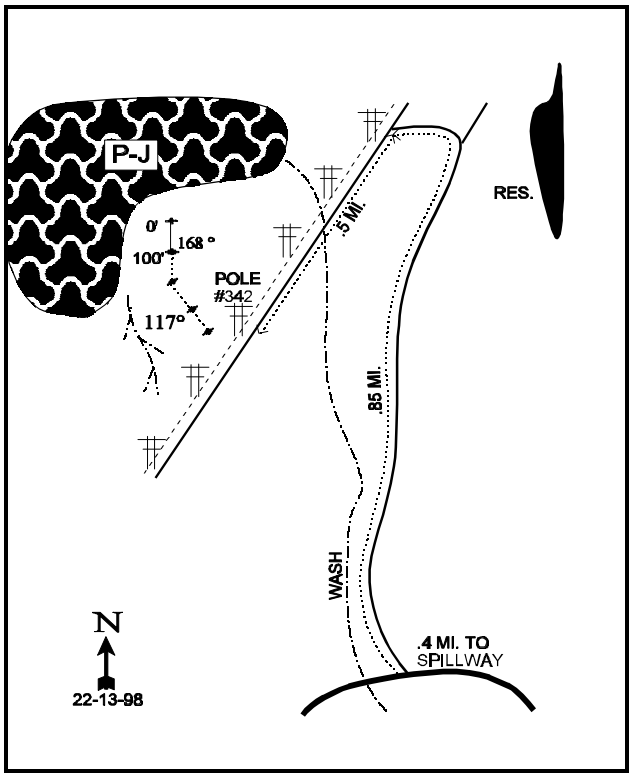
Compass bearing: frequency lines 1-2 168 degrees, lines 3-4 117 degrees.

Footmark (first frame placement) 5 feet. Frequency belt placement; line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

LOCATION DESCRIPTION

From Beaver go west on SR21 to Minersville Reservoir. From the Minersville Reservoir sign south of the reservoir, drive 1.35 miles further west on SR21 to an intersection with a dirt road. Turn right and go 0.85 miles. Take a left onto the road that takes you under the powerlines. Go 0.5 miles down across a wash and up a small hill to powerpole #342. From the pole walk 400 feet west to the 400-foot stake. The 0-foot baseline stake is marked by browse tag #7185. The 0', 100' and 200' stakes are rebar; the 300' and 400' stakes are green, half-high fenceposts.





Map Name: Minersville, Utah

Diagrammatic Sketch

Township 30S , Range 9W , Section 3

UTM 4232574.037 N, 338473.366 E

DISCUSSION

Trend Study No. 22-13 (56C-2)

The Minersville Reservoir trend study was set up to monitor trend on a small area of critical deer winter range located about 3/4 of a mile west of Minersville Reservoir. It is an open sagebrush flat with scattered Utah juniper. The transect has a south-southeast aspect with a gentle slope of 6-8% and an elevation of 5,700 feet.

Use by both livestock and mule deer was reported to be moderate in 1985. In 1991, 17 deer days use/acre was determined with little sign of livestock being observed. In both years abundant coyote sign was observed. A pellet group transect read in 1998 on the site, estimated 62 deer days use/acre and 3 cow days use/acre. Thermal and escape cover are provided by dense junipers on the hillside north of the study site. Most of the grasses on the site are warm season grasses, which can escape early season use.

Soil textural analysis indicates a sandy clay loam with a slightly acidic pH (6.3). A caliche layer occurs at a depth of about 10-12 inches. Average effective rooting depth (see methods) is 11 inches with an average soil temperature of 65.6°F at 10 inches. Although some signs of erosion are apparent, erosion does not appear to be accelerated. There are some active gullies near the site, some moderately large. The main factor limiting vegetative growth is the low amount of annual precipitation (10 to 12 inches) caused by the rain shadow effect of mountain ranges to the east and west.

Wyoming big sagebrush, the key species, shows a steady increase in percent decadence since 1985 to where it is currently at 51%. The mature plants currently average 2 feet in height, most are vigorous and only lightly browsed. In 1985, no seedlings were found and only 2% of the population were classified as young. During the 1991 reading, seedlings (biotic potential) accounted for 12% of the population, however no young were found. In 1998, 1% of the population were classified as seedlings and 5% of the population were classified as young. Eighty-five percent of the losses to the sagebrush community can be explained by the number of dead in the population. Other woody species are rare on the site and include pricklypear cactus, rabbitbrush, and young Utah junipers.

The understory consists almost exclusively of grasses. Cheatgrass is the dominate grass and provides enough fine fuels to carry a very destructive fire which would wipe out the Wyoming big sagebrush population. Cheatgrass currently accounts for 68% of the herbaceous understory cover and 48% of the total vegetation cover. Nested frequency declined significantly for galleta grass in 1991, while nested frequency significantly increased for blue grama and bottlebrush squirreltail. Nested frequencies for these species in 1998 are similar to those of 1991, although perennial grass sum of nested frequency has declined from 272 in 1991 to 208 in 1998. The forbs and some perennial grasses have possibly been depleted by severe overgrazing in the past.

1985 APPARENT TREND ASSESSMENT

The vegetative trend appears to be declining. There is very little regeneration of the sagebrush and junipers appear to be slowly invading the site. This area is generally not considered suitable for treatment and seeding because of the rocky soil surface and low precipitation. The soil trend is stable.

1991 TREND ASSESSMENT

The soil trend appears to be declining slightly with a 75% decrease in vegetative basal cover and a 38% increase in bare ground. The trend for the key browse species, Wyoming big sagebrush, appears to be stable even with the 8% increase in it's population due to further increases in decadency and 23% of the population now considered to have poor vigor. Even though the reproductive potential increased due to the number of seedlings counted in 1991, no young sagebrush were encountered and it is not known how many of the seedlings will survive. Grass and forb trend is improving due to increased nested frequencies, but it still is considered in very poor condition.

TREND ASSESSMENT
soil - declining
browse - stable
herbaceous understory - improving

1998 TREND ASSESSMENT

The soil trend is down with little current erosion evident, however percent bare ground has increased while percent rock and pavement have decreased. The browse trend is down. Wyoming big sagebrush percent decadency is steadily increasing each year and 27% of the population is now dead. The herbaceous understory trend is slightly downward. Cheatgrass is the dominate grass and constitutes a great fire hazard which could ultimately cause the loss of the Wyoming big sagebrush to the site. The perennial herbaceous trend is slightly down. Perennial herbaceous understory sum of nested frequency has declined from 272 in 1991 to 208 in 1998.

TREND ASSESSMENT
soil - down
browse - down
herbaceous understory - slightly downward, cheatgrass dominates and poses a fire threat

HERBACEOUS TRENDS --
Herd unit 22 , Study no: 13

Type	Species	Nested Frequency '85	'91	'98	Quadrat Frequency '85	'91	'98	Average Cover % '98
G	Aristida purpurea	56	59	33	27	23	14	1.61
G	Bouteloua gracilis	$_{a}$-	$_{b}$16	$_{b}$19	-	7	8	.29
G	Bromus tectorum (a)	-	-	356	-	-	99	15.16
G	Hilaria jamesii	$_{b}$138	$_{a}$90	$_{a}$72	62	46	35	2.92
G	Oryzopsis hymenoides	-	2	11	-	1	4	.32
G	Sitanion hystrix	$_{a}$34	$_{b}$76	$_{b}$65	16	39	33	1.95
Total for Annual Grasses		0	0	356	0	0	99	15.16
Total for Perennial Grasses		228	243	200	105	116	94	7.10
Total for Grasses		228	243	556	105	116	193	22.27
F	Alyssum alyssoides (a)	-	-	1	-	-	1	.00
F	Calochortus nuttallii	1	5	6	1	4	2	.01
F	Phlox longifolia	$_{a}$3	$_{b}$23	$_{a}$2	1	16	2	.01
F	Sphaeralcea coccinea	-	1	-	-	1	-	-
F	Unknown forb-perennial	3	-	-	1	-	-	-
Total for Annual Forbs		0	0	1	0	0	1	0.00
Total for Perennial Forbs		7	29	8	3	21	4	0.01
Total for Forbs		7	29	9	3	21	5	0.02

Values with different subscript letters are significantly different at % = 0.10 (annuals excluded)

BROWSE TRENDS --
Herd unit 22 , Study no: 13

Type	Species	Strip Frequency '98	Average Cover % '98
B	Artemisia tridentata wyomingensis	81	8.84
B	Ephedra viridis	-	.00
B	Chrysothamnus viscidiflorus stenophyllus	2	-
B	Echinocereus engelmanii	0	-
B	Gutierrezia sarothrae	0	-
B	Juniperus osteosperma	1	.06
B	Opuntia spp.	2	.03
B	Pinus edulis	-	.38
Total for Browse		86	9.31

CANOPY COVER --
Herd unit 22 , Study no: 13

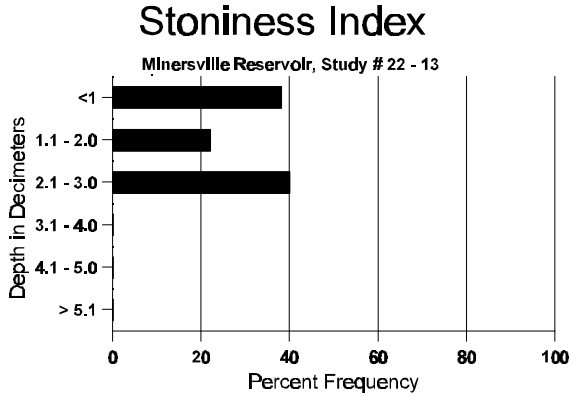
Species	Percent Cover '98
Juniperus osteosperma	.80

BASIC COVER --
Herd unit 22 , Study no: 13

Cover Type	Nested Frequency '98	Average Cover % '85	'91	'98
Vegetation	367	8.00	1.75	30.53
Rock	180	7.00	12.00	11.05
Pavement	303	45.50	31.25	25.52
Litter	389	31.75	41.75	34.77
Cryptogams	5	0	0	.01
Bare Ground	279	7.75	13.25	18.45

SOIL ANALYSIS DATA --
Herd Unit 22, Study # 13, Study Name: Minersville Reservoir

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%0M	PPM P	PPM K	dS/m
11.3	65.6 (10.1)	6.3	54.0	21.4	24.6	1.0	7.1	121.6	.5



PELLET GROUP FREQUENCY --
Herd unit 22 , Study no: 13

Type	Quadrat Frequency '98
Rabbit	13
Deer	36
Cattle	1

BROWSE CHARACTERISTICS --
Herd unit 22 , Study no: 13

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Artemisia tridentata wyomingensis																		
S	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	2	-	-	4	-	-	2	-	-	3	5	-	-	533			8
	98	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
Y	85	1	-	-	-	-	-	-	-	-	1	-	-	-	66			1
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	6	-	-	1	-	-	-	-	-	7	-	-	-	140			7
M	85	30	1	-	-	-	-	-	-	-	31	-	-	-	2066	26	26	31
	91	21	7	1	4	-	-	-	-	-	30	2	1	-	2200	24	25	33
	98	46	15	-	-	-	-	-	-	-	61	-	-	-	1220	24	31	61
D	85	15	7	1	-	-	-	-	-	-	23	-	-	-	1533			23
	91	20	2	1	4	-	-	-	-	-	10	4	4	9	1800			27
	98	61	9	-	-	-	-	-	-	-	50	-	-	20	1420			71
X	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	1040			52

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	15%	02%	00%	+ 8%
'91	15%	03%	23%	-31%
'98	17%	00%	14%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'85	3665	Dec:	42%
	'91	4000		45%
	'98	2780		51%

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Chrysothamnus viscidiflorus stenophyllus																		
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	91	1	-	1	-	-	-	-	-	-	2	-	-	-	133	8	7	2
	98	2	-	-	-	-	-	-	-	-	2	-	-	-	40	13	19	2

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	00%	00%	00%	
'91	00%	50%	00%	-70%
'98	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
'85	0	Dec:		-
'91	133			-
'98	40			-

Echinocereus engelmanii																		
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	0	5	7	0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	00%	00%	00%	
'91	00%	00%	00%	
'98	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
'85	0	Dec:		-
'91	0			-
'98	0			-

Gutierrezia sarothrae																		
D	85	2	-	-	-	-	-	-	-	-	2	-	-	-	133			2
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	00%	00%	00%	
'91	00%	00%	00%	
'98	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
'85	133	Dec:		100%
'91	0			0%
'98	0			0%

Juniperus osteosperma																		
Y	85	1	-	-	-	-	-	-	-	-	1	-	-	-	66			1
	91	1	-	-	-	-	-	-	-	-	-	-	1	-	66			1
	98	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	00%	00%	00%	+ 0%
'91	00%	00%	100%	-70%
'98	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
'85	66	Dec:		-
'91	66			-
'98	20			-

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Opuntia spp.																		
Y	85	1	-	-	-	-	-	-	-	-	1	-	-	-	66			1
	91	1	-	-	-	-	-	-	-	-	1	-	-	-	66			1
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	98	2	-	-	-	-	-	-	-	-	2	-	-	-	40	6	11	2

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	00%	00%	00%	+ 0%
'91	00%	00%	00%	-39%
'98	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)			Dec:	
	'85	66		-
	'91	66		-
	'98	40		-

Trend Study 22-14-98

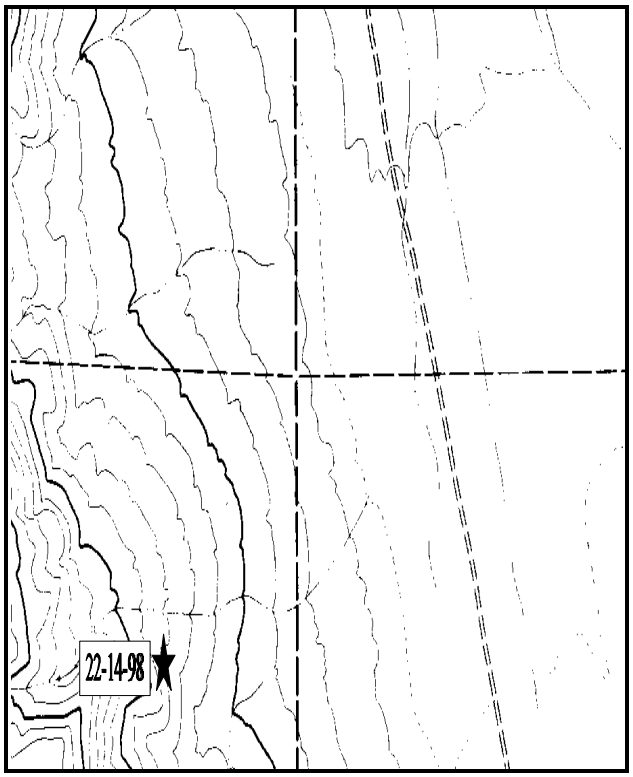
Study site name: Antelope Mountain . Range type: Big Sagebrush-Grass .

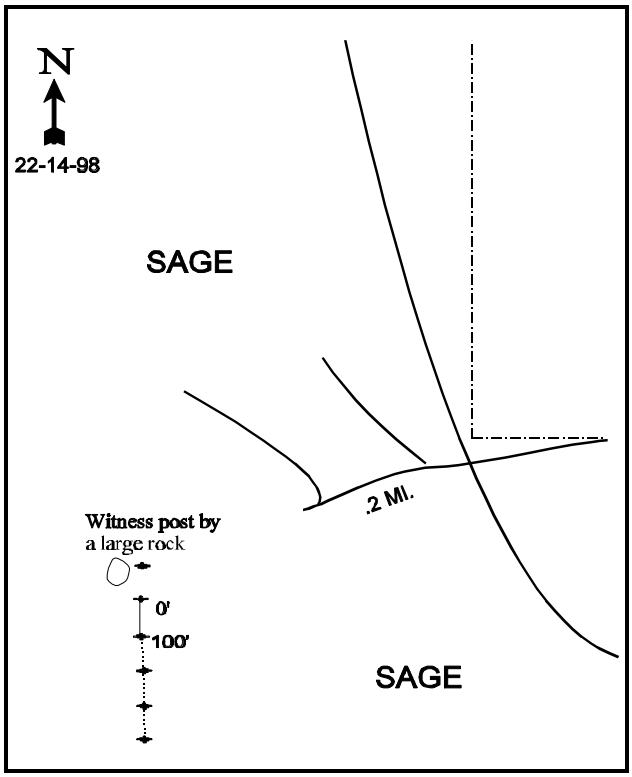
Compass bearing: frequency baseline 180 degrees.

Footmark (first frame placement) 5 feet. Frequency belt placement; line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

LOCATION DESCRIPTION

From the Cove Fort exit on I-15 (a few miles north of the Junction with I-70), proceed 12.3 miles west on a gravel road staying right at one major fork. Turn left at the intersection and continue for 2.4 miles to the southwest corner of a fence. Turn right and go 0.6 miles up this faint road. This road no longer exists. Take a bearing of 233 degrees magnetic from the old fence corner to the site. Then walk or dive off road to a witness post near a large rock. The 0-foot frequency baseline stake is 20 feet east of this rock. The baseline is marked by steel rebar posts.





Map Name: Pinnacle Pass, Utah Diagrammatic Sketch

Township 25S , Range 9W , Section 25 UTM 4275149.643 N, 342435.804 E

DISCUSSION

Trend Study No. 22-14 (56C-3)

The Antelope Mountain study is located on the northeast end of the Mineral Mountains. The transect is on an alluvial fan with a 20-25% east-facing slope at an elevation of 5,700 feet. When the study was established in 1985, the range type was big sagebrush-grass. A fire burned the entire area in 1996 and the site was then seeded and chained. There is currently a good establishment of seeded grass and forbs and some native, residual grasses.

Little sign of recent livestock use was visible on the hillside and winter deer use appeared light in 1991 with deer days use/acre estimated at 14. Two antler drops from mature bucks were found on the site, but use appears to be more concentrated a few hundred yards up slope within the head of a large draw. In 1998, a pellet group transect on the site estimated 13 deer days use/acre and 6 cow days use/acre. Overall, grass utilization was light although some intermediate wheatgrass did exhibit heavy use. Alfalfa was heavily utilized by grasshoppers which were extremely abundant in 1998. Small burnet was lightly utilized as well.

Soil textural analysis indicates a loam clay loam with a neutral pH (7.1). The soil depth is moderate and pale brown in color. The effective rooting depth (see methods) is 13 inches with an average soil temperature of 41°F measured at a depth of 13 inches. Vegetative growth may be limited due to a low amount of phosphorous (6.0 ppm) in the soil, where 10 ppm is considered minimal for normal plant development. This soil type is excessively drained and is further limited by a low water-holding capacity. Permeability is rapid and the hazard of erosion is moderate. After the fire, percent bare ground cover increased to 19% and percent cover from rock and pavement combined increased to 61%.

Prior to the fire in 1996, mountain big sagebrush was the dominant plant with the majority being lightly to moderately hedged and fairly vigorous mature plants. Thirty-five percent of the population was classified as decadent in 1985, while only 6% were categorized as young plants. In 1991, the population dropped 21% with young plants accounting for only 4% of the population and the number of decadent plants increased to 59%. After the fire, no mountain big sagebrush plants were sampled. Broom snakeweed is the most abundant browse on the site with an estimated density of 1,000 plants/acre in 1998, while contributing less than 2% cover. Broom snakeweed exhibited abundant seed heads in 1998, with no seedlings and few young plants encountered. A few cliffrose were found around the site in previous years, but these were no longer there in 1998. A few tipped over juniper skeletons are still present on the site, but it appears most trees were totally burnt.

After the fire and seeding, the dominant species on the site are crested wheatgrass, intermediate wheatgrass, bluebunch wheatgrass, and galleta. In 1991, there was a significant increase in the quadrat and nested frequency values for bluebunch wheatgrass. Sandberg bluegrass also showed a moderate increase. Forbs continue to be are quite sparse, but the ones encountered most frequently in 1998 were alfalfa, pale alyssum, Utah locoweed, and storksbill.

1985 APPARENT TREND ASSESSMENT

The range condition and trend appears to be very similar to the situation on site 56C-2/22-13. Sagebrush reproduction is limited although the plants are generally vigorous. Seedling establishment may be limited by the rocky and dry soil conditions. The soil trend is stable.

1991 TREND ASSESSMENT

The soil trend appears to be stable due to the protective covering of erosion pavement and rock. Litter cover has increased slightly since the last reading and bare ground dropped by 56%. The trend for mountain big

sagebrush is down due to decreased nested frequency values, lower population density, a 41% increase in decadent plants, an increase in plants that are heavily browsed (37%, up from 5%), an increase in the number of plants that are in poor vigor (29%, up from 10%), and a decreased reproductive potential. Trend for grasses and forbs is up.

TREND ASSESSMENT
soil - stable
browse - down
herbaceous understory - up

1998 TREND ASSESSMENT

The soil trend is downward with an increase in percent bare ground, rock, and pavement cover due to the wildfire in 1996. Erosion appears moderate at this time and is mostly due to the steepness of the slope and the rocky soil surface. The key browse species, Wyoming big sagebrush, was wiped out by the fire. Broom snakeweed is currently the most abundant shrub on the site. The browse trend is downward. The herbaceous understory trend is stable. Although perennial herbaceous understory sum of nested frequency is lower in 1998 then in 1991, considering there was a fire, the herbaceous understory appears to have established well. Cheatgrass abundance is low and the perennial species should be able to keep it that way.

TREND ASSESSMENT
soil - downward
browse - downward, loss of the mountain big sagebrush and surrounding bitterbrush populations to fire
herbaceous understory - stable

HERBACEOUS TRENDS --
Herd unit 22 , Study no: 14

Type	Species	Nested Frequency '85	'91	'98	Quadrat Frequency '85	'91	'98	Average Cover % '98
G	Agropyron cristatum	a-	a-	b158	-	-	61	6.78
G	Agropyron intermedium	a-	a-	b94	-	-	39	3.18
G	Agropyron spicatum	a11	c103	b58	6	42	26	3.55
G	Aristida purpurea	-	-	2	-	-	2	.01
G	Bromus tectorum (a)	-	-	47	-	-	17	.37
G	Hilaria jamesii	b134	b105	a53	48	44	22	2.12
G	Oryzopsis hymenoides	-	1	-	-	1	-	-
G	Poa secunda	b161	c211	a9	71	82	6	.03
Total for Annual Grasses		0	0	47	0	0	17	0.37
Total for Perennial Grasses		306	420	374	125	169	156	15.69
Total for Grasses		306	420	421	125	169	173	16.07
F	Alyssum alyssoides (a)	-	-	37	-	-	16	.08
F	Astragalus utahensis	a-	b35	b26	-	15	10	1.00
F	Comandra pallida	b26	b39	a-	10	17	-	-
F	Draba spp. (a)	-	-	1	-	-	1	.00

Type	Species	Nested Frequency '85	'91	'98	Quadrat Frequency '85	'91	'98	Average Cover % '98
F	Erodium cicutarium (a)	-	-	23	-	-	8	.95
F	Erigeron pumilus	$_{ab}$4	$_{b}$20	$_{a}$-	3	12	-	-
F	Leucelene ericoides	-	-	1	-	-	1	.00
F	Medicago sativa	$_{a}$-	$_{a}$-	$_{b}$46	-	-	25	4.86
F	Phlox longifolia	$_{a}$-	$_{a}$19	$_{ab}$3	-	10	1	.03
F	Sanguisorba minor	-	-	5	-	-	3	.10
F	Sphaeralcea coccinea	$_{a}$-	$_{a}$-	$_{b}$5	-	-	4	.18
F	Zigadenus paniculatus	$_{c}$19	$_{b}$8	$_{a}$-	12	5	-	-
Total for Annual Forbs		0	0	61	0	0	25	1.03
Total for Perennial Forbs		49	121	86	25	59	44	6.20
Total for Forbs		49	121	147	25	59	69	7.23

Values with different subscript letters are significantly different at % = 0.10 (annuals excluded)

BROWSE TRENDS --
Herd unit 22 , Study no: 14

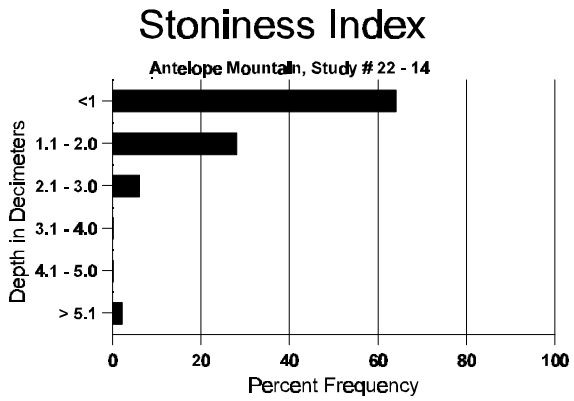
Type	Species	Strip Frequency '98	Average Cover % '98
B	Artemisia tridentata vaseyana	0	-
B	Chrysothamnus nauseosus	1	-
B	Chrysothamnus nauseosus albicaulis	0	-
B	Chrysothamnus viscidiflorus stenophyllus	0	-
B	Ephedra nevadensis	0	-
B	Ephedra viridis	1	-
B	Gutierrezia sarothrae	27	1.62
B	Juniperus osteosperma	0	-
B	Opuntia spp.	1	-
B	Tetradymia canescens	1	-
Total for Browse		31	1.62

BASIC COVER --
Herd unit 22 , Study no: 14

Cover Type	Nested Frequency '98	Average Cover % '85	'91	'98
Vegetation	306	6.25	5.00	25.04
Rock	317	25.50	31.75	21.07
Pavement	366	27.50	22.75	39.57
Litter	391	32.25	36.25	39.48
Cryptogams	60	0	0	.66
Bare Ground	323	8.50	4.25	19.08

SOIL ANALYSIS DATA --
Herd Unit 22, Study # 14, Study Name: Antelope Mountain

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%0M	PPM P	PPM K	dS/m
12.9	41.0 (13.0)	7.1	36.0	37.4	26.6	2.2	6.0	201.6	.6



PELLET GROUP FREQUENCY --
Herd unit 22 , Study no: 14

Type	Quadrat Frequency '98
Rabbit	4
Deer	16
Cattle	1

BROWSE CHARACTERISTICS --
Herd unit 22 , Study no: 14

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Artemisia tridentata vaseyana																		
Y	85	4	-	-	-	-	-	-	-	-	4	-	-	-	266			4
	91	1	-	1	-	-	-	-	-	-	2	-	-	-	133			2
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	85	16	17	3	-	-	-	-	-	-	36	-	-	-	2400	18	18	36
	91	-	10	5	-	1	2	-	-	-	17	1	-	-	1200	20	26	18
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
D	85	17	5	-	-	-	-	-	-	-	16	-	5	1	1466			22
	91	2	14	9	1	2	1	-	-	-	13	2	-	14	1933			29
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
X	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	140			7

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	35%	05%	10%	-21%
'91	55%	37%	29%	
'98	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'85	4132	Dec:	35%
	'91	3266		59%
	'98	0		0%

Chrysothamnus nauseosus																		
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	98	1	-	-	-	-	-	-	-	-	1	-	-	-	20	17	26	1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	00%	00%	00%	
'91	00%	00%	00%	
'98	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'85	0	Dec:	-
	'91	0		-
	'98	20		-

Chrysothamnus nauseosus albicaulis																		
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	0	18	27	0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	00%	00%	00%	
'91	00%	00%	00%	
'98	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'85	0	Dec:	-
	'91	0		-
	'98	0		-

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Chrysothamnus viscidiflorus stenophyllus																		
S	85	3	-	-	-	-	-	-	-	-	3	-	-	-	200			3
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Y	85	18	-	-	-	-	-	-	-	-	18	-	-	-	1200			18
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	85	41	3	-	-	-	-	-	-	-	43	1	-	-	2933	6	5	44
	91	2	-	-	-	-	-	-	-	-	1	-	-	1	133	10	10	2
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
D	85	8	2	-	-	-	-	-	-	-	6	-	3	1	666			10
	91	2	-	-	-	-	-	-	-	-	-	-	-	2	133			2
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	07%	00%	06%	-94%
'91	00%	00%	75%	
'98	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
'85	4799	Dec:		14%
'91	266			50%
'98	0			0%

Ephedra nevadensis																		
M	85	-	1	-	-	-	-	-	-	-	1	-	-	-	66	16	12	1
	91	1	-	-	-	-	-	-	-	-	1	-	-	-	66	17	25	1
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	100%	00%	00%	+ 0%
'91	00%	00%	00%	
'98	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)			
'85	66	Dec:	-
'91	66		-
'98	0		-

Ephedra viridis																		
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	98	-	1	-	-	-	-	-	-	-	1	-	-	-	20	18	14	1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	00%	00%	00%	
'91	00%	00%	00%	
'98	100%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)			
'85	0	Dec:	-
'91	0		-
'98	20		-

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Gutierrezia sarothrae																		
Y	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	24	-	-	-	-	-	-	-	-	23	1	-	-	1600			24
	98	4	-	-	-	-	-	-	-	-	4	-	-	-	80			4
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	91	52	-	-	-	-	-	-	-	-	51	-	1	-	3466	7	11	52
	98	45	-	-	-	-	-	-	-	-	45	-	-	-	900	10	17	45
D	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	10	-	-	-	-	-	-	-	-	6	-	-	4	666			10
	98	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
X	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	20			1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	00%	00%	00%	
'91	00%	00%	06%	-83%
'98	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'85	0	Dec:	0%
	'91	5732		12%
	'98	1000		2%

Juniperus osteosperma																		
Y	85	1	1	-	-	-	-	-	-	-	2	-	-	-	133			2
	91	1	-	-	-	-	-	-	-	-	1	-	-	-	66			1
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
X	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	98	-	-	-	-	-	-	-	-	-	-	-	-	-	20			1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	50%	00%	00%	-50%
'91	00%	00%	00%	
'98	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'85	133	Dec:	-
	'91	66		-
	'98	0		-

Opuntia spp.																		
M	85	1	-	-	-	-	-	-	-	-	1	-	-	-	66	5	9	1
	91	1	-	-	-	-	-	-	-	-	-	-	1	-	66	6	10	1
	98	1	-	-	-	-	-	-	-	-	1	-	-	-	20	3	8	1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'85	00%	00%	00%	+ 0%
'91	00%	00%	100%	-70%
'98	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'85	66	Dec:	-
	'91	66		-
	'98	20		-

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Tetradymia canescens																		
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	98	1	-	-	-	-	-	-	-	-	1	-	-	-	20	9	12	1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor
'85	00%	00%	00%
'91	00%	00%	00%
'98	00%	00%	00%

%Change

Total Plants/Acre (excluding Dead & Seedlings)				
'85	0	Dec:	-
'91	0		-
'98	20		-

Trend Study 22-15-98

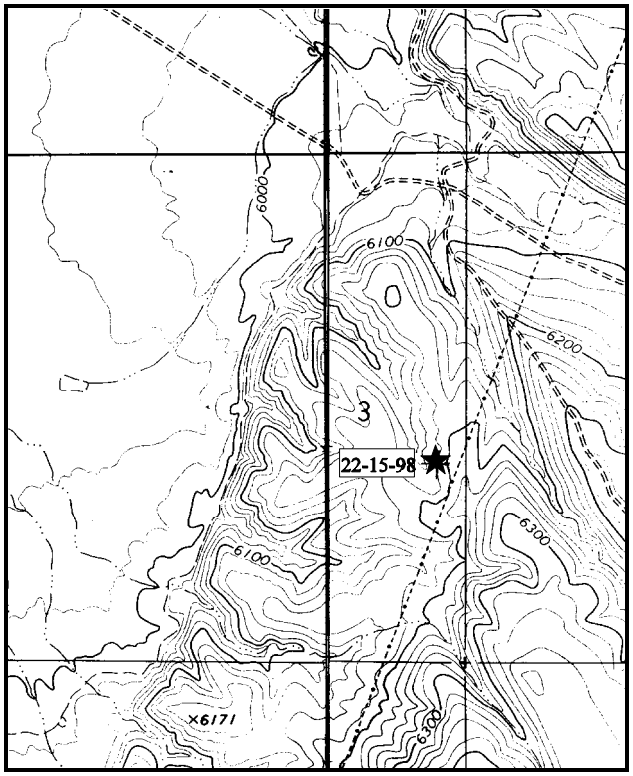
Study site name: Fremont Wash . Range type: Wyoming Big Sage/Grass

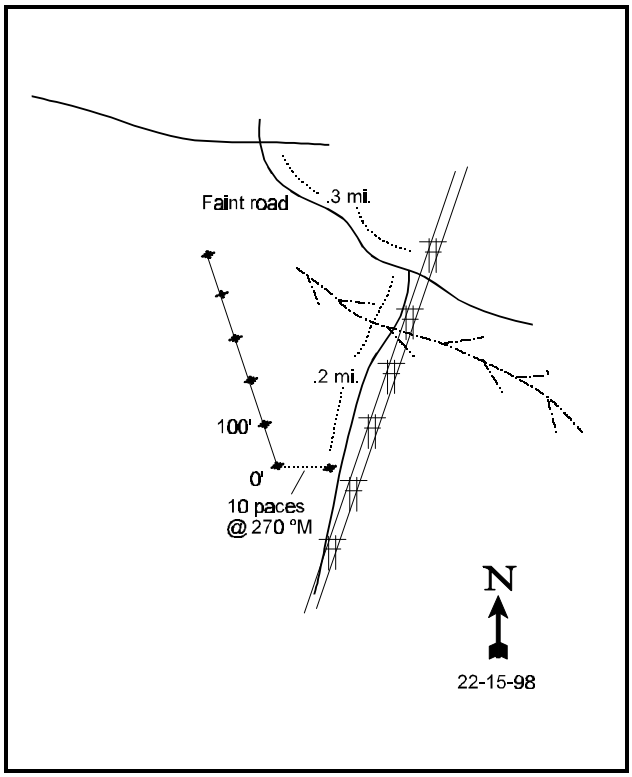
Compass bearing: frequency baseline 328 M degrees.

Footmark (first frame placement) 5 feet. Frequency belt placement; line 1 (11ft), line 2 (34ft), line 3 (59ft), line 4 (71ft), line 5 (95ft).

LOCATION DESCRIPTION

From I-15 take exit 109 and go past the Texaco station and turn right (south) onto campground road. Go 1.2 miles to where the pavement ends and a road takes off at an angle to the southeast. Take this road and go 1.4 miles to a cattleguard. Go straight another 0.5 miles to an intersection . Turn right onto a faint road down a draw for 0.3 miles. At this point there is another faint road on the right along the powerlines. Go down this road for 0.2 miles to a witness post on the right. From the witness post the 0-foot stake is 10 paces away at 270°M. The 0-foot stake is marked with browse tag #474.





Map name: Kane Canyon

Diagrammatic sketch

Township 31S , Range 7W , Section 3

UTM 4231954.946 N, 358161.973 E

DISCUSSION

Trend Study No. 22-15

The Fremont Wash trend study is located on BLM administered land south of Beaver and was established in August 1998. The area is deer winter range with a westerly aspect and a slope of 8%. Elevation is 6,200 feet. The nearest perennial water source may be the Beaver River, for there were no stock ponds or water troughs visible in the immediate area. Range type is sagebrush-grass with scattered junipers surrounding the site. Limited escape and thermal cover is located in juniper covered draws to the east and west. A pellet group transect on the site estimated 68 deer days use/acre, 1 elk day use/acre, and 41 cow days use/acre in 1998. The pellet groups encountered varied in age from a few months old to possibly approaching a year. An old (~6 years) deer antler shed was found on the site in 1998.

The moderate slope and low percent bare ground cover (8%) combine to keep erosion to a minimum. The deep draws to the east and west show extensive signs of decades of erosion. The rock and pavement cover appear to be basaltic and granitic in origin. Rocks and pavement are abundant on the soil surface and throughout the soil profile. The average effective rooting depth (see methods) is 10 inches with an average soil temperature of 67°F at 11 inches. The stoniness index indicates that many rocks and pavement are located within the upper 8 inches of the soil profile. Soil textural analysis indicates a sandy clay loam with a neutral pH (7.0). Phosphorous levels in the soil profile measure 7.1 ppm and may be limiting to vegetative growth (10 ppm is minimal for normal plant development).

The browse consists mainly of a mature Wyoming big sagebrush stand. The plants average 21 inches in height and most exhibit good vigor. Percent decadency is moderately high at 32%. Biotic potential (seedlings) may not be adequate to replace this population as it appears to be thinning, likely due to past drought conditions. There are very few plants with seed heads, and utilization is currently mostly moderate. Other browse species encountered on the site and in low densities include: Utah serviceberry, pricklypear cactus, and broom snakeweed.

The most abundant grass on the site is cheatgrass. Cheatgrass accounts for 54% of the herbaceous cover and 39% of the total vegetative cover. With the exception of cheatgrass, the site supports a good stand of warm season grasses. The most abundant is galleta followed by sand dropseed, red three-awn, blue grama, and needle-and-thread grass. There was no apparent utilization of grasses in 1998. Forbs are scarce with scarlet globemallow being the most abundant.

1998 APPARENT TREND ASSESSMENT

The soil trend appears stable with little erosion currently occurring. The moderate slope and ample vegetation and litter cover provide protection for the soil. The browse trend appears slightly downward. There are many decadent and dead plants found throughout this population. Currently, 20% of the population is dead and 31% of the decadent plants are classified as dying. Competition from the cheatgrass may not allow sagebrush seedlings to establish, thereby dying plants are not being replaced. The herbaceous trend appears stable, although the cheatgrass needs to be controlled to allow the more desirable perennial species to become establish.

HERBACEOUS TRENDS --
Herd unit 22 , Study no: 15

Type	Species	Nested Frequency '98	Quadrat Frequency '98	Average Cover % '98
G	Aristida purpurea	88	37	2.01
G	Bouteloua gracilis	61	20	1.86
G	Bromus tectorum (a)	466	100	12.83
G	Hilaria jamesii	116	44	2.55
G	Oryzopsis hymenoides	26	11	.25
G	Sitanion hystrix	13	6	.20
G	Sporobolus cryptandrus	102	46	2.83
G	Stipa comata	55	28	.79
G	Vulpia octoflora (a)	8	2	.01
Total for Annual Grasses		474	102	12.84
Total for Perennial Grasses		461	192	10.51
Total for Grasses		935	294	23.36
F	Astragalus spp.	6	2	.01
F	Lappula occidentalis (a)	1	1	.00
F	Microsteris gracilis (a)	1	1	.00
F	Sphaeralcea coccinea	39	13	.36
Total for Annual Forbs		2	2	0.00
Total for Perennial Forbs		45	15	0.37
Total for Forbs		47	17	0.37

BROWSE TRENDS --
Herd unit 22 , Study no: 15

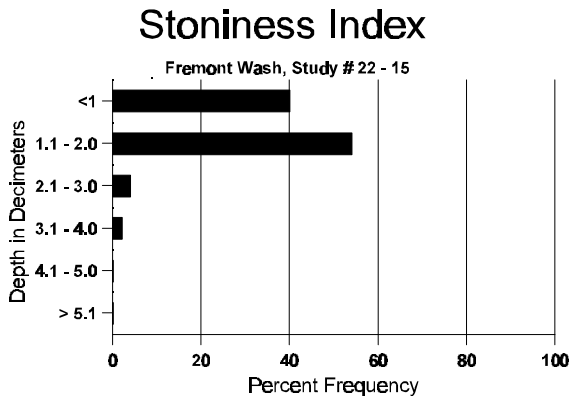
Type	Species	Strip Frequency '98	Average Cover % '98
B	Amelanchier utahensis	1	-
B	Artemisia tridentata wyomingensis	89	9.00
B	Chrysothamnus viscidiflorus viscidiflorus	-	.03
B	Gutierrezia sarothrae	0	-
B	Opuntia spp.	2	-
Total for Browse		92	9.02

BASIC COVER --
Herd unit 22 , Study no: 15

Cover Type	Nested Frequency '98	Average Cover % '98
Vegetation	473	42.79
Rock	206	4.00
Pavement	415	22.86
Litter	499	50.62
Cryptogams	14	.03
Bare Ground	292	8.14

SOIL ANALYSIS DATA --
Herd Unit 22, Study # 15, Study Name: Fremont Wash

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%0M	PPM P	PPM K	dS/m
10.2	67.0 (10.7)	7.0	53.4	22.0	24.6	1.8	7.1	134.4	.6



PELLET GROUP FREQUENCY --
Herd unit 22 , Study no: 15

Type	Quadrat Frequency '98
Rabbit	8
Elk	1
Deer	47
Cattle	10

BROWSE CHARACTERISTICS --
Herd unit 22 , Study no: 15

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Amelanchier utahensis																		
Y	98	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
% Plants Showing '98				Moderate Use 00%			Heavy Use 00%				Poor Vigor 00%					%Change		
Total Plants/Acre (excluding Dead & Seedlings)													'98		20	Dec:		-
Artemisia tridentata wyomingensis																		
S	98	6	-	-	-	-	-	-	-	-	6	-	-	-	120			6
Y	98	20	2	3	-	-	-	-	-	-	25	-	-	-	500			25
M	98	28	49	20	-	-	-	-	-	-	97	-	-	-	1940	21	30	97
D	98	6	30	22	-	-	-	-	-	-	39	-	1	18	1160			58
X	98	4	-	-	-	-	-	-	-	-	4	-	-	-	900			45
% Plants Showing '98				Moderate Use 45%			Heavy Use 25%				Poor Vigor 11%					%Change		
Total Plants/Acre (excluding Dead & Seedlings)													'98		3600	Dec:		32%
Gutierrezia sarothrae																		
M	98	-	-	-	-	-	-	-	-	-	-	-	-	-	0	6	7	0
% Plants Showing '98				Moderate Use 00%			Heavy Use 00%				Poor Vigor 00%					%Change		
Total Plants/Acre (excluding Dead & Seedlings)													'98		0	Dec:		-
Opuntia spp.																		
M	98	2	-	-	-	-	-	-	-	-	2	-	-	-	40	4	4	2
% Plants Showing '98				Moderate Use 00%			Heavy Use 00%				Poor Vigor 00%					%Change		
Total Plants/Acre (excluding Dead & Seedlings)													'98		40	Dec:		-

SUMMARY

WILDLIFE MANAGEMENT UNIT - 22 (48) - BEAVER

The unit wide soil trend appears to be improving. In 1991, twelve sites showed downward soil trends with only two sites showing stable soil trends. In 1998 many sites show stable or upward trends, with the exception of Big Cedar Cove (22-12), Minersville Reservoir (22-13), and Antelope Mountain (22-14) which showed increases in percent bare ground, rock, and pavement cover.

Due to the fire on the Antelope Mountain site (22-14), no browse species are present on the site anymore. Double Up Hollow (22-10), 'B' Hill (22-11), and Big Cedar Cover (22-12) all showed downward browse trends in 1991 and stable browse trends in 1998. Many of the remaining sites show downward or slightly downward trends for browse continued from 1991. These downward browse trends are exclusively due to increased percent decadency or continued high decadency of the key browse species. Oak Basin (22-03) and Rocky Reseeding (22-09) showed upward trends with healthy browse populations and a decrease in percent decadency of preferred browse species.

The herbaceous understory trends are generally improving, with a few exceptions. Deer Flat (22-1), Oak Basin (22-3), and 'B' Hill (22-11) show decreases in perennial herbaceous understory nested frequency since 1992. Minersville Reservoir (22-13) shows a decrease in perennial herbaceous understory nested frequency and a high amount of cheatgrass in the understory. Beaver Table (22-6) does not show a decrease in perennial herbaceous understory species, but photographs indicate an increase in cheatgrass abundance between 1992 ad 1998.

	1991			1998		
Site	Soil	Browse	Grass & Forb	Soil	Browse	Grass & Forb
22-01 Deer Flat	-	+	+	0	0	-
22-02 Piute Reservoir	-	-	-	0	-	+
22-03 Oak Basin	-	-	-	+	+	-
22-04 Wades Canyon	-	-	-	+	-	0
22-05 Bone Hollow	-	-	-	0	-	0
22-06 Beaver Table	-	-	0	+	-	-
22-07 Sheep Rock	-	NONE	+	+	NONE	+
22-08 Muley Point	0	-	-	0	-	-
22-09 Rocky Reseeding	-	0	-	0	+	0
22-10 Doubleup Hollow	-	-	-	0	0	0
22-11 'B' Hill	-	-	+	+	0	-
22-12 Big Cedar Cove	-	-	+	-	0	0
22-13 Minersville Reservoir	-	0	+	-	-	-
22-14 Antelope Mountain	0	-	+	-	NONE	0
22-15 Fremont Wash	ESTABLISHED IN 1998					

(0) = stable, (+) = upward, (-) = downward